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Alan H. Coogan

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The good old rule
Sufficeth then, the simple plan
That they should take who have the power
And they should keep who can.

Katz v. Walkinshaw[1]

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[1] 141 Cal. 116, 128, 74 P. 766, 769 (1903).

INTRODUCTION

TO A NOVICE IN THE LAW, the problems of groundwater rights seem to straddle awkwardly the physical and social realms. The law—a formal set of rules by which society is ordered—seems to the physical scientist a strangely confusing and confused tool with which to define, even in a social context, the parameters and limits of a physical continuum. For example, on the basis of attorney's briefs, bolstered even by expert testimony, judges have legally defined "subterranean streams"[2] and erected criteria for recognizing such streams that sound more like the rhetoric of Humpty Dumpty[3] than a description of a body of water one could scoop up in a bucket, or upon which one could float a rubber raft. On the other hand, it is definitely possible to float a rubber raft in underground streams, which by legal definition do not exist.[4] As one reads the cases, it is apparent, that however necessary such definitions are to the resolution of individual rights to groundwater, the definitions may transfer poorly from the facts of one case to those of another, and therefore serve a poor basis for policy.

The problem of definition has been great in the consideration of groundwater rights law. Each section of the standard reference digests, law review articles, etc., start or end with definitions. This is usually accompanied by a discussion of the variously labelled three or four schemes of water rights followed in the different states.[5]

The people of the United States live under dramatically different rules regarding the right to produce, use, store, divert and interfere with groundwater. These different sets of rules, known respectively as the English (absolute) rule, the American (reasonable use) rule, the correlative rights

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[2] *See* 55 Ohio JUR. 2d *Waters and Watercourses* § 61 (1963); 56 AM. JUR. WATERS § 108 (1962); 93 C.J.S. *Waters* § 86 (1956).

[3] "When *I* use a word," Humpty-Dumpty said, in a rather scornful tone, "it means just what I chose it to mean—neither more or less." "The question is," said Alice, "whether you *can* make words mean so many different things." "The question is," said Humpty-Dumpty, "which is to be master—that's all." L. CARROL, THROUGH THE LOOKING-GLASS 94 (1946).

[4] *See* Appendix, figs. 1, 2. "Presence of a line of bushes usually found no where except over water courses" is sufficient to establish an underground stream flowing in a known defined channel, Hale v. McLea, 53 Cal. 578, 580 (1879). "A subsurface stream . . . must be discoverable from the surface of the ground," Logan Gas Co. v. Glasgo, 122 Ohio St. 126, 131, 170 N.E. 874, 876 (1930). *Accord,* 55 OHIO JUR. 2d *Water and Watercourses* § 61 (1963). *Cf.* Frazier v. Brown, 12 Ohio St. 294 (1861); Warder v. Springfield, 9 Ohio Dec. Reprint 855 (1885). *See also* Problem Cases 2 and 18 *infra. But see* E. WARNER, *Karst Research Becoming "Legitimate,"* 19 GEOTIMES No. 7, 18 (1974). In discussing Karst, it is there noted that "water flowed with very high gradient [in subsurface karst terrain]; one test showed an underground flow of 4 miles in 72 hours" a rate of 5 feet per minute—sluggish, but still a stream.

[5] *See* 93 C.J.S. *Waters* § 86 (1956); 55 OHIO JUR. 2d *Waters and Watercourses* § 61 (1963) 56 AM. JUR. *Waters* § 113-116 (1962).

rule and the appropriation rule have been discussed repeatedly by symposium authors, casebook editors, digest compilers and law review writers; they do not require repetition here.[6]

The purpose of this paper is to outline the development and status of the law applicable to groundwater problems in Ohio, to place this law in the framework of what is called here Groundwater Problem Cases, and to summarize Ohio law on groundwater rights noting trends, exceptions and critical turning points. In addition, the paper considers the probable physical relationships in which groundwater occurs and may be affected by man's activities, which could result in damage or dispute (the Groundwater Problem Cases), and to relate these to litigated cases in Ohio, other eastern states and in western states where necessary for coverage. A brief outline of the Problem Cases precedes the section on Ohio groundwater rights law to permit reference to them as part of that discussion.

Groundwater Problem Cases—Overview

As an introduction to the following section, it is worthwhile to point to the fact that groundwater supply problems result not from a lack of water generally, but from a combination of factors which are related to the physical capacity of the subsurface rocks to accumulate, store, transmit and discharge water on the one hand, and the rules of law which apply to the rights of exploitation and use of the storage on the other. These then combine with economical factors which determine the feasibility of obtaining groundwater in place of other water supplies.

The public interest in groundwater stems from the national trend toward the increasing use of water for all purposes, a trend suggesting that by 1980 the country will require about 400 billion gallons a year,[7] or twice what it used in 1955. The selection of groundwater as a supply, rather than surface-water sources, has generally been on the basis of one or more of the following factors:

1. Groundwater may be reached within a few hundred feet of the place of use, whereas surface water may require several miles of pipelines and numerous easements;

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[6] *See generally* J. BEUSCHER, WATER RIGHTS 65 (1967) [hereinafter cited as BEUSCHER]; C. MYERS & A. TARLOCK, WATER RESOURCE MANAGEMENT 1-25 (1971) [hereinafter cited as MYERS]; W. PETTYJOHN, WATER QUALITY IN A STRESSED ENVIRONMENT 255 (1972) [hereinafter cited as PETTYJOHN]; RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1973); 55 OHIO JUR. 2d *Waters and Watercourses* § 61 (1963); 56 AM. JUR. *Waters* § 113-16 (1962); 93 C.J.S. *Waters* § 86 (1956); Annot., 29 A.L.R.2d 1354 (1953); Annot., 109 A.L.R. 395 (1937); Annot., 55 A.L.R. 1385 (1928); Piper & Thomas, *Hydrology and Water Law: What Is Their Future Common Ground?* 7 WATER RESOURCES AND THE LAW 1, 14 (1958).

[7] U.S.D.A., THE YEARBOOK OF AGRICULTURE—1955. H.R. Doc. No. 32, 84th Cong., 1st Sess. 63-74 (1955).

2. Groundwater may be available in areas where the water in streams and lakes has already been appropriated for other uses;
3. The yield from wells and springs, generally, fluctuates less than streamflow in short-term alternating wet and dry periods, owing to the nature of subsurface conditions;
4. Groundwater is more uniform in temperature, soluble mineral content, and other physical parameters, and unless stressed by man's activities, generally is free of bacterial pollution, also due to the nature of subsurface conditions.

The development of water from surface sources is a necessity where groundwater can be obtained only at excessive depths below the surface; where it cannot be obtained at any depth (*e.g.*, no potable-water reservoir rock is present); where it cannot be obtained in sufficient quantity or quality; where it is fully appropriated as in some western states; or, where the quality makes it entirely unsuitable for the intended use, *e.g.*, it is brackish due to marine water intrusion. Even where groundwater is available, it may be at a disadvantage as an alternative to surface water in that its production usually includes the cost of the power to pump it, whereas surface water may produce energy.

The controversial features of groundwater are numerous, as is illustrated by the Problem Cases. Many disputes, as to the effect of one well on another or on a spring (Problem Cases 1, 2), have been decided by the courts. Others have avoided the courts, owing to the high cost of obtaining proof of the claim. In general, groundwater hydrologists can gain an understanding of subsurface conditions by scientific and engineering methods which may seem unusual to the layman. On the other hand, it is easy to imagine that the physical scientist looking at the law applied to groundwater would be frustrated by several of its aspects.[8] First, there are the legal definitions and applications of rules of law which separate by legal categories a physical continuum.[9] The scientist may not recognize legal precedent as realistic. Secondly, there is the common experience that the courts have resolved only a few of the many possible specific conflicts which could arise from the use or interference with groundwater supplies,[10] and these on varying bases and doctrines.[11]

Briefly, three groups of Problem Cases are recognized. The first group encompasses cases involving interference with a groundwater supply and

[8] *See* PIPER, *supra* note 5, at 23, noting that "to hydrologists the current law seems confused and a confounding basis on which to attempt to resolve water problems in the future."

[9] *See infra* Problem Case 18 on the interference with stream flow by use of groundwater and problems of definition of a spring as surface or groundwater. *See generally* 93 C.J.S. *Waters* § 96(b) (1956).

[10] *See infra* Problem Cases 13, 15 and 17.

[11] *See* authorities cited note 6 *supra*.

distinguishes 17 possibilities including the interference of two wells, a well with a spring, surface excavation with a well or spring, and a variety of less common interference problems related to gas storage, salt water intrusion, groundwater flooding and mining. The second group of two cases covers the problem of interference with a surface water supply by the use of a groundwater supply. The third group encompasses cases of damage to property and other activities by the use of groundwater. The latter eight cases include problems of damage to mines, adjacent and subjacent property from groundwater use, enhancement of unstable soil conditions, development of landslides and other surface damage problems.

From the standpoint of the attorney, however, the legal rules are fixed, or nearly fixed, at least for the jurisdiction in which he is attempting to win a case or research and clarify the legal issues. From his point of view the physical realities of the scientist are facts which are to be ordered in accordance with applicable statutory law or common law precedent, even if only by analogy. New sets of facts, previously untested in courts in his or other jurisdiction, must be fit into the available legal framework. If the legislature has not acted; if no cases have been decided; or, if no exploratory articles have been written, he is at a disadvantage in not being able to foresee new fact situations about to spring from the ground; yet he is willing, required, or even eager to fit them to the law or the law to them.

To assist in the clarification of the law of water rights in Ohio, the approach used here is to establish the range of possible groundwater problems that can arise based on physical considerations, principles of groundwater accumulation, storage and flow, and on a review of cases from Ohio and other states. Based on this variety of information, 28 different situations have been identified which are listed below and discussed in conjunction with specific court cases in the third section of the report. Where possible, each of the Problem Cases is illustrated.[12]

These Problem Cases are more closely distinguished than any other available list or discussion, whether in case books on water rights or hydrologic texts. For the reader unfamiliar with groundwater storage and flow principles, it is recommended the list be read and compared to the illustrations before reading the sections on groundwater rights.

STATUS OF COMMON LAW GROUNDWATER RIGHTS IN OHIO

Frazier v. Brown—Law of the Biggest Pump

The earliest principle of law on groundwater in Ohio (called percolating water in many reports[13]) is the so-called English or absolute rule, and is based

[12] *See* Appendix A for a list of Groundwater Problem Cases.

[13] *See* 56 AM. JUR. *Waters* § 111 (1962); 93 C.J.S. *Waters* § 90 (1956); Appendix B, figs. 3 & 4.

on the legal maxim: *cujus est solem ejus est usque ad coelum et ad infernos.*[14] The rule is supported by a number of then persuasive decisions of early American and English courts, especially in the predominantly rural areas of this country, which were blessed with substantial groundwater supplies or little water supply demand. The legal effect of the general principle is that groundwater extracted from one's land is part of the freehold[15] and derived from one's ownership of the soil, *i.e.*, the property of the landowner. He can sink a well, or many wells, or otherwise capture groundwater without any consideration of the effect of these activities on the use of groundwater by neighbors. The corollary consequence is that the neighbor may do the same. The result may be that the landowner with the greater capacity to produce groundwater (or even to waste it) will do so with impunity. He may do this without regard to prior uses, without fear of the previous establishment of a prescriptive right, and without regard to known principles of groundwater storage and flow.[16] The basis for the establishment of this stance on groundwater rights in Ohio is the 1861 holding of the Ohio Supreme Court in *Frazier v. Brown.*[17]

In 1856, the plaintiff, Joseph Frazier, owned and operated a farm in Fairfield County, Ohio. A spring of water was located near his dwelling which fed into a small rivulet crossing his land.[18] Frazier used the water for domestic and agricultural purposes. In October of that year, Jacob Brown, the defendant, dug a hole on his land. Frazier claimed Brown did it maliciously and wickedly and for the purpose of destroying Frazier's spring. It did in fact destroy the spring and caused the rivulet to cease flowing, adversely affecting Frazier's water supply (a Problem Case 2 situation). The common pleas court found for the defendant and the case came eventually to the Ohio Supreme Court on appeal. Apparently, the case was one of first impression in the state.

The defendant, and defendant in error, countered the appeal with four propositions:

(1) That a landowner's title to subterranean water is the same as to subterranean rock or other substance, not a mere usufruct, but an absolute title;

(2) That the rules of law applicable to surface streams, as between

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[14] Literally translated as: "His is his alone and is from the heavens to the depths of the earth."

[15] *See* 56 AM. JUR. *Waters* § 111 (1962): "Percolating water is usually regarded as constituting part of the land in which it is found." *See also* 93 C.J.S. *Waters* § 90 (1956).

[16] Corpus Christi v. Pleasanton, 154 Tex. 289, 276 S.W.2d 798 (1955).

[17] 12 Ohio St. 294 (1861).

[18] *But see* 93 C.J.S. *Waters* § 91 (1956), recognizing a spring as the source of a natural stream in a riparian state and classifying it as a natural watercourse. *Accord,* Conobre v. Fritsch, 92 Ohio App. 520, 111 N.E.2d 38 (1952).

riparian owners, are not applicable to subterranean waters as between adjacent proprietors;

(3) That an adjacent proprietor's right to enjoy the use of subterranean water from another's land is necessarily an easement which must be founded on grant, either express or implied . . . and that mere lapse of time will not raise the presumption of a grant, . . . the subject matter being necessarily secret, hid and the enjoyment thereof wanting the element of notoriety[19] which is essential to make the enjoyment adverse, or the basis of prescription; and,

(4) That malicious intent on the part of a landowner in appropriating or diverting subterranean water on his land, will not give an adjoining proprietor a right of action against him.[20]

The supreme court affirmed the lower court's decision for the defendant.

It is important to note that there were several assumptions underlying Brown's plea, that subsequently were incorporated into the reasoning and holding of the court, and which are related to the physical realities of groundwater storage and flow. Implicit in the first proposition is that groundwater is static rather than fugitive, and hence, is property in the same sense as rock and valuable mineral deposits.[21] This contradicts known conditions in almost all groundwater reservoirs, even those not being extracted for human water supplies. The second proposition assumes that there is an intrinsic difference between groundwater and surface water, or that they are not related or relatable.[22] This assumption contradicts reality. The court's third proposition included the presumption that the occurrence of groundwater is necessarily a matter of mystery. Judge Brinkerhoff maintained that its occurrence was hidden, secret and not known, knowable or part of common knowledge. The assertion may have been true in 1861, but hardly can be maintained today.

In weighing the pleas of the parties, the learned Judge Brinkerhoff carefully considered the prevailing common law of some of the eastern states and of England in the mid-19th century.[23] Judge Brinkerhoff accepted the then extant and still current legal definitions of waters in Ohio, recognizing four types:[24] (1) surface streams in well-defined channels; (2) diffused surface

[19] "The word *notorious*, as used in reference to groundwater means that which is publically or generally known and spoken of," Wyandot Club v. Sells, 6 Ohio N.P. 64, 9 Ohio Dec. Reprint 106 (1899); 55 OHIO JUR. 2d *Waters and Watercourses* § 61, n. 21 (1963).

[20] 12 Ohio St. at 297.

[21] *See* 93 C.J.S. *Waters* § 88 (1956).

[22] *But see infra* Problem Case 18.

[23] Judge Brinkerhoff's reasoning relied on both American and English precedent cited throughout the reported decision; *see, e.g.*, Wheatley v. Baugh, 25 Pa. 528 (1855); Chatfield v. Wilson, 28 Vt. 49 (1855); Greenleaf v. Francis, 18 Pick. 117 (Mass. 1836); Acton v. Blundell, 152 Eng. Rep. 1223 (1843).

[24] C. CALLAHAN, PRINCIPLES OF WATER RIGHTS LAW IN OHIO § 4-9 (1959) [hereinafter cited as CALLAHAN].

water (generally water flowing overland during heavy rains before it enters a defined channel); (3) subsurface streams which flow in permanent, distinct and well-defined channels; and, (4) subsurface waters not in permanent, distinct channels which percolate, ooze or filter through the ground. The last, commonly known as groundwater, was the principal subject of the court's opinion. The situation regarding subsurface streams, while important, was not the focus of the holding in *Frazier*.

First, it is desirable to closely define the issues decided in *Frazier* and the reasons and precedents for the decision in terms of those previously outlined, before expanding on their extension and effect. They were framed, of course, by the pleadings and were repeated by the court:

> The question then is, whether—in absence of all rights derived either from contract or legislation—a land owner can have any legal claims in respect to subsurface waters, which, without any distinct and definite channel, ooze, filter, and percolate from adjoining lands into his own, when such waters are diverted, retained, or abstracted by the owner of such adjoining lands in the use of his property, for any object of either taste or profit, even though the use may be accompanied by a malicious intent to injure his neighbor by means of such use?[25]

The court answered no, by saying that:

> . . . we are of the opinion that the law of the land can recognize no such claims; and that subject only to the possible exception of a case of unmixed malice, the maxim *"cujus est solum ejus est usque et ad infernos"* applies to its full extent; and whatever damage may result from the exercise of this absolute right of property, to adjoining proprietors from the loss of such percolating subsurface waters, is *damnum absque injuria*.[26]

The reasoning of the decision is crucial to our present-day resolution of water supply problems and management, not only because it has been accepted almost without question by subsequent courts in Ohio, but because in the light of modern understanding and public need, a different conclusion may and has been reached under similar facts and reasoning, but relying upon different assumptions.[27] Judge Brinkerhoff left no doubt as to the basis for his opinion, upholding the absolute rule. His reasoning was as follows:

> Because of the existence, origin, movement and course of such waters, and the causes which govern and direct their movements, are so secret, occult and concealed, that an attempt to administer any set of legal rules

[25] 12 Ohio St. at 304.
[26] *Id.*
[27] *See infra* Problem Case 1.

in respect to them would be involved in hopeless uncertainty and would be therefore, practically impossible.

Because any such recognition of correlative right, would interfere, to the material detriment of the common wealth, with drainage and agriculture, mining, the construction of highways and railroads, with sanitary regulations, building and the general progress of improvement in works of embellishment and utility.[28]

Likewise, he clearly stated the reasons for rejection of any acquisition of prescriptive rights,[29] saying:

That the doctrine of prescription, or presumption of grant from lapse of time, can have no proper application to the question . . . because the party against whom the doctrine would have to be applied, could not be reasonably required to enter his *caveat* against the appropriation of a thing so hidden and obscure as is percolating underground water.[30]

The two principal reasons given by Judge Brinkerhoff in support of applying the absolute rule in Ohio require separate treatment. His second reason will be considered first.

Judge Brinkerhoff argued that recognition of a correlative (or presumably other) right in groundwater would interfere to the material detriment with commerce and industry. Clearly, his reasons if valid in 1861, can have no influence today without reconfirmation. Today, in fact, in Ohio there is concern for a legally acceptable, modern, non-interfering manner of providing for major water supplies from groundwater sources[31] in the face of the absolute rule. Many domestic and commercial supplies are destroyed without a resolution of this problem. The reasoning of Judge Brinkerhoff is contradicted in states where water is scarce,[32] and where in order to preserve and enhance agriculture and industry, water management by a state agency using a permit system requires conservation and limitations on pumping. Obviously, Ohio must do more than baldly assert that anything but an absolute property right to groundwater will detrimentally affect commerce and industry in 1975. Adequate, clean, well-engineered, legally protected water supplies are essential for civic and industrial growth.[33]

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[28] 12 Ohio St. at 311.

[29] *See* 56 AM. JUR. *Waters* § 115 (1962); 93 C.J.S. *Waters* § 90, 164 (1956).

[30] 12 Ohio St. at 311.

[31] *See* notes 120-21 *infra* and accompanying text.

[32] Reis, *A Review and Revitalization: Concepts of Ground Water Production and Management—The California Experience*, 7 NAT. RES. J. 53 (1967) [hereinafter cited as Reis].

[33] According to information from A. Walker, Division of Geological Survey, Ohio Department of Natural Resources, partly from the unpaged *South West Ohio Water Plan* (unpublished), there are two important management recommendations regarding

There are two elements to the first of Brinkerhoff's reasons requiring comment. The first element is the assertion, which was taken from earlier cases, that the nature of groundwater is "secret, occult and concealed," and the corollary based on this conclusion, that no attempt to administer any set of rules could be successful. Assuming that these statements were true in 1861, what is the situation in fact and in law in 1975?

In 1861, one of the few and then best known compendia of geologic knowledge was Lyell's *Principles,*[34] in its fifth edition of three volumes. Sir Charles Lyell was a contemporary of Darwin, the latter taking the first edition on the *HMS Beagle*[35] in the late 1830's. The United States Geological Survey was formed in 1877 by an explorer of the west, Major Powell, then busy fighting the Civil War.[36] From this state of infancy, scientific knowledge has grown. By 1975, the United States Geological Survey had published hundreds of water supply papers; water is a big business and the engineering and scientific know-how is undisputed.

In 1975, the existence and origin of groundwater and the causes that govern its movement (principally gravity) are *knowable,*[37] but not necessarily

groundwater supplies for Ohio. Management Recommendation No. 1: "enact legislation requiring that all groundwater withdrawals for public and private purposes of 100,000 gallons per day or more be reported monthly in an appropriate manner to a single state data collection agency." Management Recommendation No. 2: "enact legislation giving the Division of Water of the Department of Natural Resources the right to designate critical groundwater areas and to regulate all private and public groundwater withdrawals of 100,000 gallons per day or more within the designated critical area."

[34] F. ADAMS, THE BIRTH AND DEVELOPMENT OF THE GEOLOGICAL SCIENCES 266 (2d Ed. 1954).

[35] C. DARWIN, THE VOYAGE OF THE BEAGLE 282 (1958).

[36] C. FENTON & M. FENTON, GIANTS OF GEOLOGY 239 (1952).

[37] *See generally* BEUSCHER, *supra* note 5, at 2; MYERS, *supra* note 5, at 533 *et seq.;* W. WALTON & T. PRICKETT, HYDROGEOLOGIC ELECTRIC ANALOG COMPUTERS 67 (1963); Zeigler, *Water Use Under Common Law Doctrines,* 7 WATER RESOURCES AND THE LAW 51 (1958) [hereinafter cited as Zeigler]. In Corpus Christi v. Pleasanton, 154 Tex. 289, 276 S.W.2d 798 (1955), Justice Wilson, in dissent, criticizes the Texas Supreme Court decision in Houston & T.C.R. Co. v. East, 98 Tex. 146, 81 S.W. 297 (1904), which followed Frazier v. Brown, 12 Ohio St. 294 (1861), stating at 154 Tex. at 300, 276 S.W.2d at 805:

> This dire prediction [in Frazier]—like much prophecy—overlooked the possibility of advance in knowledge and technique. It is understandable that this rationale should appeal to this court in 1904 but I regret to see us affirm it now, as the majority does, in 1955—especially in view of the development since 1904 of our comprehensive knowledge and experience in oil and gas regulation.
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> I am convinced that the rationale of *Frazier v. Brown* has been rebutted and answered by the course of our history and the entire trend of our jurisprudence since that decision and since the East case. Although this court can close it eyes to the advancement of scientific and legal knowledge and governmental techniques by reaffirming this rationale as the majority do here, I do not believe that this court will always do so, and for that reason the substance of this dissent seems worth filing.

or even in some circumstances likely, known by the groundwater supply interferor or interferee. Accordingly, a standard might be established which would serve as a guide to determining liability in groundwater supply disputes (*e.g.*, Problem Cases 1-4). However, one cannot say in 1975 that *Frazier v. Brown* could not arise again in spite of well-known scientific knowledge. The principles of groundwater origin, flow and storage are known—the facts in a given dispute may not be, or may be too expensive to collect. The more rural the land, the more shallow the well, the less likely that the interferor will be aware of the general principles or their application to his own or his neighbor's land. Anyone can drive a 10- to 20-foot sand-point well; anyone can dig a swimming pool next door and interfere with that well. Hence, as it was for Judge Brinkerhoff, the problem of specific knowledge remains today; but in addition, there has been added the problem of scale.[38]

The second element of Brinkerhoff's reasoning relates to manageability. He stated that, because of the secret nature of groundwater, "any attempt to administer a set of legal rules" would meet with "hopeless uncertainty and practical impossibility." Of course, this is no longer true. Several states have adopted a permit system for groundwater development administered by a state agency.[39] A permit system is most common in the western "dry" states (New Mexico, Colorado, Oregon, etc.), but also has been adopted in Iowa, Indiana and Florida.[40] A permit system presumes the opposite of Brinkerhoff's assertion. The fact that the permit systems work refutes his assertion. In addition, it is worthwhile pointing out a famous management problem in southern California resulting in a dispute between competing pumpers. The problem was partly resolved in court. Styled as *Pasadena v. Alhambra,*[41] it is also commonly referred to as the *Raymond Basin* adjudication. As described by Reis[42] and Beuscher,[43] the situation which was litigated over a decade resulted in the establishment of a plan of water extraction for a whole basin, including numerous pumpers, and finally led to legislation in California, which provided for a cooperative solution to production of scarce groundwater supplies. The result has been an allocation of some water for almost all, and a

[38] *Cf.* RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1973), stating the reasons for adopting the exception to non-liability for interference with groundwater where there is unreasonable harm caused by lowering of the water table by large withdrawals.

[39] *See* MYERS, *supra* note 5, at 184 *et seq.*

[40] Plager, *Emerging Patterns for Regulation of Consumptive Use of Water in the Eastern States,* 43 IND. L.J. 397 (1968).

[41] 33 Cal. 2d 908, 207 P.2d 17 (1949). *See also* Annot., 42 A.L.R.3d 469 (1972).

[42] *See* Reis, *supra* note 32.

[43] *See* BEUSCHER, *supra* note 6, at 55: "The Raymond Basin has been protected against overdraft during the 11-year period . . . despite . . . one of the worst droughts in the history of the southwest. In fact, there has been an increase in the 'safe yield' in the 20 years the basin has been under management of about 40%."

maintenance of the water level in the basin which provides supply to a large population. The action brought in 1937 by the City of Pasadena sought to declare its rights to water in the basin, determine the available water supply, enjoin all pumping in excess of the "safe yield," and enjoin those with "inferior" rights.[44] Twenty years later the "safe yield" has increased.

Other successful examples of groundwater management can be selected from California and New Mexico.[45] Hence, it can be demonstrated that with the requisite scientific and engineering knowledge, groundwater supplies can (and in some situations must) be managed. Judge Brinkerhoff's conclusion is without support in 1975, and false in particular where there is sufficient hydrogeologic knowledge or the money to obtain it.[46]

What element is left to support the rule of *Frazier?* It is the problem of knowledge as opposed to knowability. The question for Ohio in 1975 is: How one can abandon *Frazier* in order to promote the general welfare and at the same time not create another unworkable set of rules? In the conclusion of the paper, the question of suitable standards and test for the difference between knowledge and knowability are considered.

Additional Issues Decided by the Supreme Court of Ohio

Four other cases with published opinions reached the Supreme Court of Ohio, which are pertinent to understanding the common law regarding groundwater rights in Ohio. These, to be discussed in turn, were *Elster v. Springfield,*[47] *Collieries Co. v. Cocke,*[48] *The Logan Gas Co. v. Glasgo*[49] and *Barberton v. Miksch.*[50]

In *Elster v. Springfield,*[51] the Ohio court in 1892 was presented with a dispute between the plaintiff landowner and the City of Springfield. The city had excavated a part of Center Street to lay pipes for the city's sewer system. The plaintiff owned property adjoining the street on which he maintained a spring (or well)[52] in his basement which failed after the sewer construction began. He brought suit in the common pleas court to recover for the destruction of his water supply. A verdict for the defendant was certified to

[44] *See* Reis, *supra* note 32.
[45] *See* MYERS, *supra* note 6, at 184 *et seq.*
[46] *Accord,* Corpus Christi v. Pleasanton, 154 Tex. 289, 300, 275 S.W.2d 798, 805 (1955) (Wilson, J., dissenting).
[47] 49 Ohio St. 82, 30 N.E. 274 (1892).
[48] 107 Ohio St. 238, 140 N.E. 356 (1923).
[49] 122 Ohio St. 126, 170 N.E. 874 (1930). *See also* Annot., 55 A.L.R. 1386 (1928).
[50] 128 Ohio St. 169, 190 N.E. 387 (1934).
[51] 49 Ohio St. 82, 30 N.E. 274 (1892).
[52] The common practice of digging out a natural spring and enclosing it as a catchment makes it difficult to distinguish in older cases between the terms spring and well.

the circuit court which affirmed for the defendant. Before the supreme court, the defendant argued that the city did not encroach or trespass on the plaintiff's property; that the water was not drawn out of the spring but intercepted before reaching the spring; and, that the plaintiff is not entitled to recover under the rule of *Frazier*. The court answered the issue by stating that:

> [T]he law, at least in Ohio, is settled to the effect that no right exists in the owner of one piece of land to receive percolation through the land of another, and that such a right cannot be acquired by prescription. The same rule must apply to a spring supplied by percolating waters. We regard these questions as entirely covered by the case of *Frazier v. Brown*, 12 Ohio St. 294, and the authorities there cited, and discussion of them here would be superfluous. From these rules it results that in water percolating through the earth under Center Street, or under the surface of lands of others in the vicinity of the spring, the plaintiff had no ownership, nor had he a right to insist that they should flow as they had theretofore flowed.[53]

There were other issues not pertinent to this discussion also considered by the court. There was no doubt in the court's mind that the water previously available to Elster was interfered with by the city's excavation. In the discussion of the facts, it was noted that the walls of the sewer were not made water tight, the water of the spring and water from sources which had supplied the spring were carried off in part under the walls of the sewer and in part by seepage through the walls of the sewer. The syllabus of the court states:

> No right by prescription can exist as to percolating water, nor is one prevented from making any lawful and legitimate use of his own land, by digging or otherwise, even though the effect is to drain a spring on the land of an adjoining proprietor. Injury to the spring, therefore, by draining it, or cutting off water supplied to it by percolation, would not, *per se*, be actionable.[54]

The issue before the court is referrable to Problem Case 3 and is not identical with that decided by *Frazier*, a Problem Case 2 situation. In this regard, the court extended the rule with regard to the common law in Ohio, although it did follow the precedent from other jurisdictions as to the extent and applicability of the absolute rule. It also followed the cases cited in *Frazier* which were based on a Problem Case 3 situation.[55]

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[53] 49 Ohio St. at 99-100, 30 N.E. at 278.

[54] *Id.* at 84, 30 N.E. at 275.

[55] *Accord*, In Re Conservancy District, 25 Ohio N.P. (n.s.) 325 (1925) which involved another ditching, where the Common Pleas Court of Montgomery County concluded that the loss of groundwater is not the subject of damages in Ohio unless made so by contract. Lacking any provision for such loss in the contract between the City of Dayton and the Miami Conservancy District, there was no right of action because of loss by the city of a well owing to the lowering of the bed of the Mad River by about three feet.

In 1923 a case came to the Ohio Supreme Court in which the Ohio Collieries and the National Coal Company had been sued by landowners for damage to the surface of their lands owing to the subsurface removal of coal. The two cases, *Ohio Collieries Co. v. Cocke* and *National Coal Co. v. Goffee*[56] were joined at the higher court. The situation was that the coal companies had failed to leave sufficient support pillars, as is customarily required in careful mining. The result was the collapse of the strata and subsidence above the collapse zone which affected the ground surface. Among the several issues certified to the court was the question of whether there can be recovery for a loss of springs or wells, fed by groundwater, which is the result of subsidence. Viewed in geological terms, this is a Problem Case 24 situation.

The court in considering the question repeated the rule of *Frazier,* but distinguished this case from those previously considered. Here the court said:

> [A] clear line of distinction is to be drawn between those where the loss of spring or well is due to subsidence of surface on the account of withdrawal of proper subjacent support and those where loss of percolating water is due simply to removal of coal. The cases relied upon by plaintiff in error are the cases that refer to loss of percolating water on account of removal of coal.[57]

The court noted that this distinction (the difference between a Problem Case 2 and 5 or 6 situation) was well made in the case of *Wills Creek Coal v. Stage,*[58] a common pleas court decision affirmed without report by the Supreme Court of Ohio, where the charge to the jury stated, in part:

See also Wyandot Club Co. v. Sells, 6 Ohio N.P. 64, 9 Ohio Dec. Reprint 106 (C.P. 1899) (Problem Case 3 situation) in which the defendant, Sells, apparently excavated a quarry site and interfered with plaintiff's spring. The case, as reported, consists only of the charge to the jury. It has been cited as bearing on the question of malicious intent by the defendant to destroy plaintiff's spring and generally supporting the view that if there is a case of unmixed malice, the defendant could be held liable in spite of the otherwise strict application of the English Rule. *See, e.g.,* CALLAHAN, *supra* note 24, at § 52; OHIO LEGISLATIVE SERVICE COMM'N, WATER RIGHTS IN OHIO, RESEARCH REPT. No. 1 16 (1955) [hereinafter cited as WATER RIGHTS]. *See also* 27 OHIO DIGEST *Waters and Watercourses* § 103 (West 1950), which cites the case for definitions of groundwater and subsurface streams and for well-known tests for a subsurface stream; Dissette v. Lowrie, 6 Ohio N.P. 392, 9 Ohio C. Dec. 545 (1899), which was a case of construction interference, and is an example of a Problem Case 3 situation, was litigated at the trial level without appeal. The locale was Glenville on St. Clair St. in Cleveland, Ohio, which was undergoing suburban development in 1899. The developer had cut into the land to drain it and install water pipes which diverted the flow of a pond. The court found for the defendant developer citing the rule in Frazier and stating that the plaintiff could not improve his land on the basis of another's land, the opposite of what had happened.

[56] 107 Ohio St. 238, 140 N.E. 356 (1923).

[57] *Id.* at 259, 140 N.E. at 362.

[58] 77 Ohio St. 643, 84 N.E. 1135 (1908). *Accord,* Wheatley v. Baugh, 25 Pa. 528 (1855); 93 C.J.S. *Mines and Minerals* § 274 (1956), stating: "as a general rule, persons engaged

> If . . . the taking out of the coal destroyed the sources of waters in the coal, then the company is not liable; but if the water was diverted from the well by reason of the fact that the defendant removed the support or weakened the support of the premises in which were the sources of the water, then the company is liable, because it had no right to weaken and destroy the support of the premises of the plaintiff. . . .[59]

Basically, the rule regarding the right to subsurface support was established, as noted in *Collieries,* in *Burgner v. Humphrey.*[60] This rule holds that if an owner of land grants a lease whereby he conveys all the underlying minerals, with the right to mine and remove the coal, the lessee will not be entitled to remove the whole of the coal without leaving support sufficient to maintain the surface in its natural state.[61]

With regard to water rights, the holding of the Ohio Supreme Court in *Collieries* speaks to the situation illustrated in Problem Case 24, and is to be distinguished from the situation in Problem Case 23 where the pumping of groundwater from an excavation (or another well) might cause damage to the surface of the land. This situation has been litigated in Ohio, but only in the context of removal of lateral support, and not as a groundwater problem.

In 1930, the Ohio Supreme Court faced an issue already decided in *Frazier* 69 years previously.[62] Glasgo, the plaintiff (defendant in error), had owned a 173-acre farm in Ashland County with a dwelling which was supplied with water from a spring nearby. Within a few days after the Logan Gas Co. began drilling a gas well on the adjacent farm about one-half mile away from the Glasgo spring, the flow of water decreased and the spring later became dry. Subsequently, the spring filled only following heavy rains, and remained dry during the summer, requiring the plaintiff to drill a deeper well to obtain a sufficient supply of water. Lying between the Glasgo property and the gas well was another farm of one Haudenschield where a spring was located which was not disturbed by the drilling. The case came to the supreme court from the court of appeals of Ashland County. It was also reported, in the trial of the case, that the drilling company had sunk a water well near the

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in ordinary mining operations are not responsible for damages to flow of percolating waters" citing Sloss-Sheffield Steel & Iron Co. v. Wilkes, 236 Ala. 173, 181 So. 276 (1938).

[59] 107 Ohio St. at 259, 140 N.E. 363.

[60] 41 Ohio St. 340 (1919).

[61] *Compare* Pennsylvania Coal v. Mahon, 260 U.S. 393 (1922) where this physical problem was considered and where the state law which countermanded the effect of a contract between the landowner (passed through several hands) and the mine owners and owners of the subsurface coal, so that the miners had no liability for subsidence from removal of coal, was held to be unconstitutional as a state "taking."

[62] Logan Gas Co. v. Glasgo, 122 Ohio St. 126, 170 N.E. 874 (1930).

gas well, from which water flowed, and this supposed interference also became a basis for a claim. At the trial court, the defendant, Logan Gas Co., offered no evidence, but moved for a directed verdict. The motion was overruled and the jury returned a verdict for the plaintiff, Glasgo, in the amount of $3,000. The judgment was affirmed by the court of appeals.

At the Ohio Supreme Court, the question became simply one of whether the facts warranted any recovery as judged in the trial court, the law presumably being clear, *i.e.*, the rule of *Frazier*. The plaintiff claimed, of course, that the drilling of a well on higher ground by Logan Gas Co. diverted an underground channel of water. The court quickly noted that the plaintiff could recover only on the theory that the facts showed the water to be in an underground stream, citing the well-known presumption of water law (by this date) that groundwaters are considered to be percolating if "it does not appear that the waters which come to the surface are supplied by a definite flowing stream."[63] It cited the still current evidentiary rule that one who claims rights in an underground flowing stream has the burden of showing its existence. The test it accepted was that "a subsurface stream . . . must be discoverable from the surface of the ground."[64] It is quite generally held, the court said, "that an underground stream, . . . the direction and course of which can only be discovered by excavation, is not a known stream governed by the rules applicable to surface water courses."[65]

Clearly, the court did not envision the tools of modern science, especially those of geophysics, but it thoroughly anticipated the testimony of expert witnesses, seemingly preferring the lowest common denominator of knowledge, when it applied the test that:

> The rule has been quite generally adopted . . . that the requirement as to a known and defined channel places the burden upon the plaintiff . . . to show that without opening the ground by excavation, or having recourse to abtuse speculations of scientific persons, men of ordinary powers and attainments would know, or could with reasonable diligence ascertain, that the stream, when it emerges into light, comes from and has followed through a defined subterranean channel.[66]

This gratuitous judicial observation on the pertinence of scientific and engineering judgments on practical affairs is somewhat below the dignity of the court, however close it is to the probable truth that most groundwater is

[63] *Id.* at 129, 170 N.E. at 875.
[64] *Id. See generally* 55 OHIO JUR. 2d *Waters and Watercourses* § 51 (1963), citing Logan Gas Co. v. Glasgo, 122 Ohio St. 126, 170 N.E. 874 (1930). *Accord,* 93 C.J.S. *Waters* § 86 (1956): ". . . and not discoverable from surface indications without excavations for that purpose." *See also* 56 AM. JUR. *Waters* § 108 (1962).
[65] 122 Ohio St. at 131, 170 N.E. at 876.
[66] *Id.* at 131, 170 N.E. at 876.

percolating. From the geological standpoint, *Logan Gas* is an example of Problem Case 14 if the interference resulted from the drilling of the gas well and Case 1 if from the interference of one water well with another. The case added little to the development of groundwater law in Ohio except a little folk wisdom disguised as a test for determining the difference between percolating waters and underground streams.

In the case of *Barberton v. Miksch,*[67] Jerome Miksch owned a 76-acre tract of land in the valley of Wolfe's Creek in Summit County which was suitable and available, both for farming and sale in acreage tracts. The City of Barberton had its own problems, a lack of water. In its function as a municipal corporation, the city constructed a reservoir, called the Barberton Reservoir, and the resultant rise in the groundwater table in the adjacent land caused water to flow through the ground onto and into the land of Miksch. The plaintiff (defendant in error) claimed that this new-found water "rendered his land sour, wet, swampy and permanently unfit and unsuitable for use as farm land or for a subdivision or any other useful or valuable purpose." He was awarded a sum of $3,500 by the trial court and the decision was affirmed by the court of appeals.

Several issues in the case as decided by the Ohio Supreme Court are not pertinent here, inasmuch as they address the standing of his widow to sue and the status of the city in a proprietary role. The water issue, which the court faced, was whether the water which seeped and percolated into Miksch's land as the result of the construction constituted a trespass? The court answered yes. It did not dwell on its reasons, simply stating that they were in conformity with the previous uniform decisions of the court holding that, under the circumstances, liability is not dependent upon negligence, and noting that a discussion of a few of the cases had already appeared in *Mansfield v. Balliett.*[68] Interestingly, the court did not approach the issue as one relating to groundwater; that is, it did not address it as an example of a Problem Case 2, but instead as a case of trespass related to surface storage of water, presumably with roots in case law back to *Rylands v. Fletcher.*[69]

Ohio Lower Court Decisions

So little of importance regarding varied problems of groundwater has been decided by the Supreme Court of Ohio after *Frazier* that a substantial portion of the comment and citation of Ohio groundwater law revolves around

[67] 128 Ohio St. 169, 190 N.E. 287 (1934).
[68] 65 Ohio St. 451, 63 N.E. 86 (1902), where the issue was one of the city's use of Balliett's farm for public purposes without compensation and the creation of a private nuisance caused by discharge of sewage on Balliett's farm from a stream into which the city dumped the raw sewage, not an entirely comparable set of circumstances.
[69] L.R. 3 H.L. 330 (1868), *aff'g* L.R. 1 Ex. 265 (1866).

one circuit court case from 1893 on an underground stream and its interference with a spring, and three cases heard in the courts of common pleas in 1885, 1899 and 1924. These will be briefly reviewed for the purpose of noting new elements, definitions and tests introduced for the situations already considered, and because there are Problem Cases, not yet discussed, adjudicated in these reports. Finally, they require discussion because they are widely regarded and cited as the substantive water law in Ohio.[70]

The City of Springfield is distinguished in Ohio by its history of at least 100 years of water supply problems. The case of *Warder v. Springfield*[71] is but one episode in that struggle to gain an adequate supply. The case has been quoted and cited, probably because it considers a complicated fact situation, cites considerable precedent, and details the problem of water rights in groundwater and stream water where these rights interfere. From a hydrological standpoint, the case also clearly points out the established relationship between groundwater and stream water. The final court order restricted the pumper from taking stream water through the ground.

The facts in the case fall under the situation described as Problem Case 18. Warder and his partner Barnett were the proprietors of a flour mill in the City of Springfield. The mill was located on the bank of Buck Creek from which they obtained water as a riparian owner. Barnett had constructed a dam and a canal, or race, which ran from the dam about 8,000 feet to the mill. The riparian right was conceded. The city, in order to obtain a better water supply, proposed to lay pipe along the creek about 2.5 miles north of the dam and to pump groundwater into the pipe. The groundwater was to be obtained from a parcel of land of about seven acres, purchased by the city, which lies between the confluence of Buck Creek and a plainly marked channel of a spring branch of Beaver Creek. During the construction of the well field between the two creeks, pumps were installed to drain the land below the water table to enable the contractor to lay pipe. He had to use pumps with a combined capacity of one and one-half million gallons per day. The result of the pumping was that the water in the spring branch disappeared, as did the standing water in the marshes in the vicinity. To the east of Buck Creek and north of Beaver Creek, on higher ground, two wells went dry during the pumping. On cessation of pumping, the water reappeared in these wells.

The question to be answered by the court was to what extent, if at all, the plaintiffs had a right to waters which the city would take by reason of construction and maintenance of the well field. It would seem under the rule of *Frazier* that the city would have an absolute right to obtain all the

[70] *See* CALLAHAN, *supra* note 24; 55 OHIO JUR. 2d *Waters and Watercourses* § 59 *et seq.* (1963).
[71] 9 Ohio Dec. Reprint 855 (1855).

groundwater it could pump from its land without regard to any potential interference with the level of the adjacent creeks. The *Warder* court repeated this rule stating that: "Such waters, coming from no one knows where and flowing no one knows whence, are not property."[72]

Of course, the court and the parties knew very well where the water came from—the creeks, and they knew where it went or was going to—into the city's water pipes. The plaintiff would be harmed by the city's diversion of the creek upstream from his dam and race in that the water supply behind the dam would be diminished or be non-existent, and his riparian right would be valueless without water in the stream. The theory of the plaintiff was that all the water in and about a section of land which would supply the defendant's reservoir would be drawn directly or by filtration from the creeks. The defendant claimed that it would all come from percolating water. The court found that there was:

> A strong, steady flow of water into the bottom through the gravel as from a supply basin. This supply is doubtless largely furnished from the water suspended in the . . . gravel and drawn from higher lands to the east.
>
> There is a supply of water upon the surface . . . and percolating in the soil, not in defined channels to which plaintiffs have no right, and which defendants may lawfully take. . . .
>
> If it were not for future rainfall, this supply would under the enormous drain of nearly two million gallons per day, made by the reservoir and pipes connected with the city pumping house, become ultimately exhausted. The draft would then inevitably begin upon the waters sustaining the waters in the creeks and then quickly upon the waters of the creeks themselves.[73]

The court then stated its duty to determine how much the city may rightfully appropriate without invading the plaintiff's property rights.[74] The court relied on the experience and pumping history of the construction. The defendant, of course, argued that the drying of the creeks was not the result of withdrawal of water after it is in the channel of the creek, but by intercepting the percolating water before it reaches the channel. The court dismissed this contention as one not proven by the defendant, regardless of its possible legal consequences, and cited the proposition of the English case of *Grand Junction Canal Co. v. Slugar* that "if you cannot get at the

[72] *Id.* at 861, presumably referring to the law of capture.
[73] *Id.* at 863.
[74] *Cf.* Wheatley v. Baugh, 25 Pa. 528 (1855), standing for the proposition that there are "perfect rights," presumably the riparian property right here, and "imperfect rights," such as the right to capture water, which are held to have less advantage. *But see* Higday v. Nicholaus, 469 S.W.2d 859 (Mo. 1971), Problem Case 1 as between two pumpers and the unresolved reverse situation in Problem Case 9.

underground water without touching the water in a defined surface channel, I think you cannot get at it at all."[75]

The *Warder* court concluded by citing its duty to protect the citizen in the enjoyment of his property, through the use of an injunction, from unlawful encroachments of others whether attempted by municipal or private corporations. It held that the city had no right to destroy the easement of the plaintiffs in the dam and race by withdrawing water flowing in the channels of Buck or Beaver creek or the spring branch so as to reduce the waters of Buck Creek at the plaintiff's dam below their ordinary level. The court then specifically enjoined the defendant "from withdrawing water from their reservoir . . . to exceed a half million gallons of water per day."[76]

The case has been extensively quoted here for several points it makes, for its holding, which contradicts the established rule, and because it customarily is cited not for what it holds, but for the contrary! In *Warder* the court clearly accepts the known and demonstrated physical continuity between the groundwater in the city's land and the stream level of the spring branch. In spite of its citation of *Frazier* as the well-settled rule, it holds contrary to *Frazier* that a landowner does not have an absolute right to percolating water but has a limited right—limited to the extent that his withdrawal of groundwater does not interfere wih stream flow. Note that one of the cases relied on by the court in *Frazier, Chasemore v. Richards,*[77] was also a Problem Case 18 situation as was *Warder.* Contrary to what the *Warder* court said it was doing, it is clear that the holding can be cited for the proposition that there are correlative rights in groundwater versus stream water, and may even be cited for the concept that the prior appropriator of the stream water, that is, the senior appropriator in the terminology of the non-riparian states, should be guaranteed his supply.[78]

The court's reasoning is quite in line with the physical facts of groundwater movement, makes good hydrologic sense, but is not in line with the well-settled common law of Ohio. Apparently, the case was not appealed. It is interesting to note that authoritative reference works cite *Warder* in

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[75] 9 Ohio Dec. Reprint at 863.

[76] *Id.* at 864.

[77] 2 Hurl & Norman Rep. 982 (1857).

[78] *Accord,* Meeker v. East Orange, 77 N.J.L. 623, 75 A. 379 (1909). *See also* RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1973), stating (a) that the interferor is not subject to liability unless "The withdrawal of water has a direct and substantial effect upon the water of a watercourse or lake . . ." and the comment to clause (c) citing no reasons other than it is an interference with the watercourse although occurring outside the channel which defines the watercourse (!). But what effect if the interferor cannot foresee, or in fact cannot know even subsequent to the pumping, that he is drawing down the stream?

support of the rule of *Frazier*.[79] It appears that for an instant in 1887, Ohio had at least in part adopted the reasonable use or appropriation rule as between riparian and groundwater users. The case is in accord with majority holdings, but not with the spirit or reasoning that supports *Frazier v. Brown*.[80]

The issues in *Castalia Trout Club v. Castalia Sporting Club*,[81] were decided in the Erie Circuit Court in 1893. The facts are complicated and difficult to visualize from the report of the case. Had the court not found that the spring owned by the Castalia Trout Club was fed by an underground stream, the case would illustrate the Problem Case 2 situation, as it probably should, if one adheres to the proposition that groundwater is percolating. However, the court found that there was indeed an underground stream issuing from the limestone to establish Big Cold Creek. It therefore applied the law pertinent to the rights of riparian owners and consequently *Castalia* is not a case involving rights to percolating waters. Rather, it is frequently cited for the definition of a subterranean stream. If presented to a court today, it seems probable the presumption that all groundwater is percolating would be difficult to overcome and the case would be decided on the basis of the rule of *Frazier, i.e.*, for the defendant rather than against him.

The plaintiff in *Lewis v. Mount Adams and Eden Park Inclined Plane Ry. Co.*,[82] residing in Hamilton County, claimed that the railway company excavated footings for two piers to hold up the tracks. The excavation interfered with the groundwater flow onto his property, increasing it, and making the ground soggy. As the earth softened, his house settled and cracked. This is a Problem Case 26 situation. There was no opinion reported by the court, but the charge to the jury as reported was that: "[t]hough the defendant may have dug below [the groundwater] nine feet, unless actual injury resulted therefrom to the plaintiff it would not give him a right to recover."[83] The district court, in summarily affirming the trial court's ruling below, stated that, while a party has no right to throw water on the land of an adjacent landowner, an action cannot be maintained for the diversion of a subsurface stream onto adjacent property if its course was unknown.

As noted, the opposite conclusion was reached in *Miksch*,[84] which

[79] *See* CALLAHAN *supra* note 24, at § 51; 55 OHIO JUR. 2d, *Water and Watercourses* § 67 (1963).

[80] *See* WATER RIGHTS *supra* note 55, at 16, in which the Ohio Legislative Service cites Warder together with Frazier to support the proposition that: "it seems the well-settled rule of law in Ohio that a landowner may make full use of the waters percolating beneath the surface of his land. He is not liable for damages if neighboring owners lose their water as a result of his operations."

[81] 8 Ohio C. Dec. 693 (1893), *aff'd* 56 Ohio St. 749 (1897).

[82] 7 Ohio Dec. Reprint 566, Wk. Law Bull. 1007 (1878).

[83] *Id.* at 567.

[84] 128 Ohio St. 169, 190 N.E. 287 (1934).

presumably overrules this case, although it can be distinguished by the fact that in *Miksch* one party was a governmental agency. For further precedent on this point see the discussion of Problem Case 27.

Summary of Ohio Groundwater Law

The current status of groundwater law in Ohio, based on Ohio Supreme Court cases, is that there have been only a few issues actually decided. Specifically, only those outlined as Problem Cases 1, 2, 3, 14, 18, 23, 24 and 26 have been decided, none having been ruled upon in about the last 40 years. The situation is summarized by Callahan in his introduction to *Principles of Water Rights in Ohio,*[85] where he states that the fundamental case law on the use of water in Ohio is more than 50 years old (in 1957) and the issues have not been reexamined in later cases. He quotes a remark by Justice C. William O'Neill referring to the "cabin on the bank" nature of Ohio's system of water law and stresses that these cases cannot reflect the water problems of a modern industrial state.[86]

In groundwater interference cases, the Ohio Supreme Court has applied the absolute rule which prevails whether the interferor is appropriating the water by means of a well,[87] an excavation,[88] a mine,[89] or otherwise. Also, pumpers interfering with springs[90] are not liable for damages. But, damage to the surface of the land from mining, which thereby affects the water supply, is actionable.[91] Contrary to what might be expected by adhering to the absolute rule which makes appropriated groundwater property, it is suggested at a lower court level that the sanctioned taking of groundwater is limited to non-interference with established riparian rights to stream water if the groundwater pumping draws down the stream.[92] However, there was no rationale established by the court to show why one right should be superior to the other.

There appears to be one groundwater principle which is opposed to the general application of the absolute rule[93] in Ohio. Although there is no

[85] *See* CALLAHAN *supra* note 24, at 1. [86] *Id.*
[87] 122 Ohio St. 126, 170 N.E. 874 (1930).
[88] 49 Ohio St. 82, 30 N.E. 274 (1892).
[89] 77 Ohio St. 643, 84 N.E. 1135 (1908).
[90] 12 Ohio St. 294, 30 N.E. 278 (1861).
[91] 107 Ohio St. 238, 140 N.E. 356 (1923).
[92] 9 Ohio Dec. Reprint 855 (1855).
[93] 12 Ohio St. 294, 30 N.E. 278 (1861). The question of malicious intent is partially covered in the discussion of Problem Case 1 *infra,* especially in the cases of Drinkwine v. State, 300 A.2d 616 (Vt. 1973), and Huber v. Merkel, 117 Wisc. 355, 94 N.W. 354 (1903). *See also* 55 OHIO JUR. 2d *Waters and Watercourses* § 68 (1963) (noting point as specifically left undecided in Frazier v. Brown, 12 Ohio St. 294 [1861]); 56 AM. JUR. *Waters* § 119 (1962) (concerning the aspect of waste); 93 C.J.S. *Waters* § 94 (1956) (citing Gagnon v. French Lick Springs Hotel, 163 Ind. 687, 72 N.E. 849 [1904]; Wheatley v. Baugh, 25 Pa. 528 [1855]; Huber v. Merkel, 117 Wisc. 355, 94 N.W. 354 [1903]).

liability for taking groundwater from another's land through one's own, it has been held a trespass to cause groundwater to seep onto adjacent land[94] to its detriment so as to materially affect the land's use and value. Presumably, *Miksch* in essence overrules the holding implicit in the jury charge in *Lewis,*[95] where the law was interpreted to be that no liability arose unless the actual excavation caused the damage.

Few of the various possible groundwater disputes have arisen to the attention of the Ohio courts for at least two reasons. First, Ohio long has been a relatively water-rich state. Secondly, the application of the absolute rule and its more or less consistent extension by analogy to cases outside the original fact pattern of *Frazier* probably has discouraged litigation. As water becomes more scarce in some areas of the state, plaintiffs undoubtedly will try to argue for the abandonment of the strict application of the absolute rule.[96]

GROUNDWATER PROBLEM CASES

The following section contains a discussion of the 28 identified physical situations in which disputes may arise regarding the use of groundwater and the resultant damage from the use or interference with groundwater. Reviewing the cases, it is clear that the same physical situation, *e.g.*, interference of one well with another, may be decided differently based on a number of traditions with regard to the law of that jurisdiction. These fall principally into several categories:

1. Precedent regarding the doctrine followed, *i.e.*, whether the absolute rule, reasonable use rule, appropriation rule or the correlative rights rule prevails.
2. Precedent regarding use of water within the boundaries of these four doctrines (or absence of them), *e.g.*, precedents regarding malicious or wasteful use of groundwater.
3. Precedents with regard to definitions of what is groundwater in various circumstances. For example, precedents as to whether a spring is groundwater, or the starting point of a surface stream may decide the issue.
4. Rules of law not specifically related to groundwater or water rights in general, *e.g.*, in damage cases the law of torts or contracts may apply.

The approach here is to review the physical situations in the framework of the Problem Cases, to note those situations where the issues have been

[94] 128 Ohio St. 169, 190 N.E. 387 (1934).
[95] 7 Ohio C. Dec. 566 (1878).
[96] *See* MacArtor v. Graylyn Cress III Swim Club, 41 Del. Ch. 26, 187 A.2d 417 (1963); Higday v. Nickolaus, 469 S.W.2d 859 (Mo. 1971), for examples of successful litigation which argued for the abandonment of the absolute rule.

litigated, the bases for the courts' reasoning and decision and to some extent to develop a line of cases, where appropriate.

Problem Case 1 Interference with groundwater supply to a well by pumping of another well.[97]

This is the simplest case and one which has been litigated in many states, including Ohio. The situation illustrated shows a well tapping a groundwater supply at a shallow level which is interfered with by the sinking of a deeper well and heavier pumping. As a result the water table is lowered by the development of a cone of depression to a lower level causing the loss of supply of water to the first well.

Problem Case 1 has been considered by the courts many times. In one of the earliest American cases, *Greenleaf v. Francis,*[98] it was decided that the owner of land may dig a well on any part of his land, notwithstanding that he diminishes the water in his neighbor's well, unless he is motivated by a malicious intent to deprive his neighbor of the water without benefit to himself. The case is cited for the principle of the absolute rule.

An oft-cited case illustrating this situation is *Huber v. Merkel.*[99] In *Huber,* the plaintiff brought an action in equity to restrain the defendant from wasting the water from artesian wells on the defendant's land on the grounds that the use interfered with the flow of water from the plaintiff's well on his land. Both were farmers, living within a half mile of one another in Wisconsin. The defendant on lower ground had two artesian wells which he allowed to flow continuously to their full capacity. He sold some of the water, used some to supply a fishpond on his land and allowed the remainder to soak back into the ground. The result of the full flow was that the water level in the plaintiff's well dropped and he had to pump to obtain water for domestic and farm purposes. Other neighbors in this small, 13-square-mile area of artesian production, regulated their wells in a manner which benefited all.

Having first found that no subterranean stream existed, the Supreme Court of Wisconsin stated that it was clear that the appellant had a right, resulting from ownership, to sink a well and use the water as he chose. The plaintiff argued that statutory provisions of Wisconsin law provided that artesian well owners must use due care and diligence to prevent any loss, or waste or unreasonable use of water as to deprive or diminish flow in any artesian well to the injury of another owner in the same vicinity. Thus, plaintiff's argument was based on the premise that the Wisconsin statute

[97] *See* Appendix B, fig. 5.
[98] 18 Pick. 117 (Mass. 1936).
[99] 117 Wisc. 355, 94 N.W. 354 (1903).

established the reasonable use rule.[100] The defendant and appellant argued that the statute deprived him of property without due process of law, that it was a taking of property without compensation and that it was special legislation. The Wisconsin court found that the imposition of the reasonable use doctrine could only be sustained if it was a proper exercise of police power. The court could not comprehend how it could be applied in these circumstances since "it does not even pretend to conserve any public interest."[101] The court even remarked that "upon its face its purpose is to promote the welfare of one citizen by preventing his neighbor from using his own property."[102] The court held that the statute's effect was that of taking private property for private use and without compensation. It reversed the judgment (essentially readopting the English rule) and remanded the case with directions to dismiss. *Huber* is commonly cited for the proposition that even malicious and wasteful use of groundwater is sanctioned, although it is arguable that the court was addressing itself to other questions.[103]

The absolute rule has been sustained as recently as 1973, in Vermont, where that state's highest court considered a Problem Case 1 situation. In

[100] *See* RESTATEMENT (SECOND) OF TORTS § 858A, at 153 (Tent. Draft No. 17, 1973), which points out that the American reasonable use rule embodies a special meaning of the term "reasonable use." A waste of water or a wasteful use of water is not reasonable only if it cause harm, and a use of water that causes harm is nevertheless reasonable if it is made on or in connection with the overlying land. The withdrawal of water for transportation and sale off the land, even for the most beneficial purposes, such as municipal and domestic supply, is not reasonable in this special sense. Nevertheless, the use of water is not restricted to the overlying land and large water users may transport water from the land if no harm ensues. *But see* Jones v. Oz-Ark-Val Poultry Co., 228 Ark. 76, 306 S.W.2d 111 (1957) where the use of groundwater on the property for watering chickens substantially affected adjacent property owner's well used for domestic purposes.

[101] 117 Wisc. at 366, 367, 94 N.W. at 358 (1903).

[102] *Id.*

[103] Huber v. Merkely was specifically overruled by the Supreme Court of Wisconsin in State v. Michels Pipeline Construction, Inc., 63 Wisc. 2d 278, 217 N.W.2d 339 (1974), which considered the interference by the City of Greenfield, Wisconsin, in the construction of a sewer line with groundwater supplies of private well owners. The water was taken by pumping the city's wells at 5,500 gpm to dewater the ground to a depth of 40 feet to permit tunneling for the sewer causing a drop in the water table, drying up of wells, hardening and cracking of foundations and driveways, which are all found as elements of Problem Cases 1, 3 and 27. The issues before the Supreme Court of Wisconsin were whether the pumping constituted a public nuisance, to which it answered in the affirmative, and whether it constituted facts sufficient to form a cause of action. The court restated at 63 Wisc. 2d at 288-89, 217 N.W.2d at 343, the holding in *Huber* to be that "there is no cause of action for interference with ground water" and that malicious intent did not affect the right to divert groundwater with impunity. In rejecting its previous decision in *Huber,* the court considered the English, reasonable use and correlative rights doctrines, dismissing them in favor of the draft statement of the RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1973), which declares that no liability for the beneficial use of groundwater results unless the withdrawal causes unreasonable harm by lowering the water table.

Drinkwine v. State,[104] the Vermont court confirmed the rule even in a situation where interference of two pumpers resulted from a state project and where in similar instances other state courts have modified the rule. In *Drinkwine,* the plaintiff had a spring or well on his land which provided water for domestic and animal use. The state began a drilling program in 1969 to supply groundwater for the Salsbury State Fish Hatchery, adjacent to the plaintiff's land. The pumping by the state caused the plaintiff's well to go dry and he had no other source of water. The plaintiff argued that the state of science had progressed to such an extent that the flow of groundwater was predictable, and that water had become scarce in Vermont to such an extent that it warranted a change in the law. Yet, the court held that there are no correlative rights in groundwater. It framed the issue as whether or not the court should modify the absolute rule to the reasonable use rule in light of environmental conditions. It cited *Chatfield v. Wilson,*[105] reaching back to 1855 for precedent supporting the absolute rule, and further stated that the plaintiff had not carried the burden of proof that water was so scarce in Vermont as to warrant a change in the law. It is important to note the reasoning in *Chatfield* was very similar to that in *Frazier, i.e.,* that groundwater is by nature "secret, changeable and uncontrollable." Thus, in spite of the proven engineering and geological capability of the State of Vermont to find and produce a source of water, the court relied on the "myth of ignorance" to justify its position and did so in spite of the fact that the state was taking the Drinkwines' only source of water for a public purpose.[106]

In other jurisdictions where the absolute rule has prevailed, courts have recognized that the absolute right to appropriate groundwater is not a right at all when the small, private landowner is faced with the prospect of competing with a commercial user or with the government. As early as 1900, a New York court faced with the problem of governmental interference with private water supplies and the question of knowledge of groundwater source and movement, held for the plaintiff whose wells were threatened.[107] The plaintiff, Forbell, operated a farm in Queens, Long Island, New York. The City of New York purchased 12 acres, installed wells and a pumping plant fully aware of the operation and habits of the water in its own and adjacent land. Thus, the city was fully cognizant of the fact that to capture the greater part of this

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[104] 131 Vt. 127, 300 A.2d 616 (Vt. 1973).

[105] 28 Vt. 49 (1855).

[106] Compared with the now rejected holding in *Huber,* the Vermont court's decision is biting and highlights the disparity in strength of the state with its technological and legal capacity to defeat a private groundwater producer under the "law of the biggest pump." Apparently the absolute rule doctrine can defeat the constitutional prohibition against taking without compensation.

[107] Forbell v. City of New York, 164 N.Y. 522 58 N.E. 644 (1900).

water would result in a lowering of the underground water to such an extent that the owners would have been unable to grow crops.

The court awarded Forbell $6,000 damages. It found that this was not a case where the groundwater was unobservable from the surface or so unknown as to be speculative. To the contrary, before the City of New York constructed the well, "it ascertained to a business certainty that they could obtain water."[108]

The court's reasons for finding the city liable are pertinent to the reasoning in *Frazier*. In essence, the court followed the reasoning in *Frazier*, that is, if the presence and movement of groundwater is indeed secret, occult and unknown, then the interferor may not be liable, but that was not the case here.[109] The court reasoned that the absolute rule was unjust, and said that "it does wrong the letter of the law in defiance of its spirit." Further, it recognized that the water supply of a great city is more important than the use made by Forbell for growing celery and water cress, but that the city can exercise its rights of eminent domain and provide its residents water without injustice to Forbell.

An important consideration of Problem Case 1 came about in a Missouri case in 1971,[110] which emphasized the magnitude of the situation we face today compared with the time of Judge Brinkerhoff's decision in *Frazier*. Because of the importance of the case's clear exposition of the facts and reasoning, it will be reviewed at some length. The plaintiff and appellant, Higday, owned 6,000 acres in the McBaine Bottom in Boone County, central Missouri, near Huntdale along the north side of the Missouri River. Underlying his land was "porous rock, gravel, and soil." Water infiltrating through this sediment came from the adjacent Missouri River and was trapped in the river basin fill underneath by limestone which prevented significant downward infiltration from the valley fill, so that a huge moving body of water existed in the subsurface of the river plain on which the plaintiff lived and farmed.

The respondent, City of Columbia, with 50,000 inhabitants, had been seeking an adequate source of water since 1948 to replenish its dwindling supply. Following the advice of consulting engineers, it settled on a plan of extraction by shallow wells from the supply underlying the river plain and planned to transport the water 12 miles to the city for sale. The citizens had approved bond issues for the development of the water supply in the McBaine Bottom. Further scientific analysis and measurement of the water resources followed. With the aid of a test well, it was determined that the water table when undisturbed, rose to an average of 10 feet below the ground

[108] *Id.* at 524, 58 N.E. at 645.
[109] *Cf.* RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1973).
[110] Higday v. Nickolaus, 469 S.W.2d 859 (Mo. 1971).

surface. The water moved at a rate of two feet per day, displacing 10.5 million gallons of water daily past a given line.

The city, by threat of condemnation, acquired from some of the appellants five well sites on about 17 acres. The city then threatened to take groundwater at the rate of 11.5 million gallons per day, that is, to mine the groundwater, and to do so for purposes unrelated to any beneficial use of the overlying land. This mining of the groundwater at the overdraft rate of one million gallons per day (mgd) would reduce the water table in the area from about a depth of 10 feet to a new subsurface depth of about 20 feet. The appellants complained that the reduction would divert groundwater normally available for their crops, livestock and personal use and would eventually turn their land into an arid and sterile surface. That portion of Missouri required intensive irrigation for farming.

On the basis of the above allegations, the plaintiffs sought a judicial declaration that the city was without any right to extract the groundwater for sale or any other use not related to the beneficial ownership or enjoyment of the overlying land. They claimed that lacking that declaration, the city would deprive them of the reasonable use of the groundwater under their lands. They therefore requested an injunction.

The facts showed that the city's plan to exploit the McBaine Bottom had advanced to the point where well sites had been obtained. The city had committed almost 5 million dollars to the project and had sites for wells and a water treatment plant and the laying of pipe was almost complete. Once the wells were in, the city claimed it had the right to withdraw groundwater in any amount it desired.

The city's position was that they have no obligation to the appellants. The city claimed the appellants had no legal right which was subject to infringement by them, thus, there was no controversy and no declaratory relief could be rendered. The city stated that since 1895 Missouri had recognized the common law rule that a landowner has absolute ownership to the waters under his land and thus may withdraw any quantity of water for any purpose, even if the result is to deprive the plaintiff of water. Such use by the city, it claims, is *damnum absque injuria* and not actionable.

The court reviewed the definitions of underground streams, the absolute rule and reasonable use rule and concluded that the principal difficulty in the application of the reasonable use rule is in determining what constitutes a reasonable use. Then citing cases from eastern and western states, it said:

> However, the modern decisions agree that under the rule of reasonable use, *an overlying owner, including a municipality may not withdraw percolating water and transport it for sale or other use away from the*

> *land from which it was taken if the result is to impair the supply of an adjoining landowner to his injury.* Such a use is unreasonable because non-beneficial and "is not for a lawful purpose within the general rule concerning percolating waters, but constitutes an actionable wrong for which damages are recoverable. . . ."[111]

The city, of course, contended that the absolute rule prevailed in Missouri both by judicial decision and by statute, but the court reviewed judicial and legislative history and decided that it was not until 1860 that it was decided: "that, without liability to an adjoining owner, an overlying owner might exhaust the groundwater to furnish a municipal water supply."[112] It found that there was no law of any kind on the subject at the time the common law was adopted by statute in Missouri. It further decided, unlike the Vermont court in *Drinkwine,* that the subsequent English decisions on percolating waters were not more binding on them than the decisions of any court of another state and that: "[t]here is no impediment of inherited doctrine to our determination of the question presented according to the justice of the case."[113]

The court held for the plaintiff (appellant) reversing the trial court and remanding the case for further proceedings. It declared that the rules which govern the use of groundwater in Missouri "are the same which apply to surface water" (perhaps a poor choice of words) that is, the reasonable use rule. Under this rule, it found:

> . . . the fundamental measure of the overlying owner's right to use the groundwater is whether it is for . . . beneficial enjoyment of the land from which it was taken. Thus, a private owner may not withdraw groundwater for purposes of sale if the adjoining landowner is thereby deprived of water necessary for the beneficial enjoyment of his land.[114]

The court further stated:

> Here the municipality has acquired miniscule plots of earth and by use of powerful pumps intends to draw into wells on its own land for merchandising, groundwater stored in plaintiff's land, thereby depriving

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[111] *Id.* at 866, *citing* Bristor v. Cheatham, 75 Ariz. 227, 255 P.2d 173 (1953) (Arizona is one of the driest appropriation states); Rothrauff v. Sinking Spring Water Co., 196 Mich. 75, 163 N.W. 109 (1917); Meeker v. East Orange, 77 N.J.L. 623, 75 A. 379 (1909); Forbell v. City of New York, 47 App. Div. 371, 61 N.Y.S. 1005 (1900); Canada v. Shawnee, 179 Okla. 53, 64 P.2d 694 (1937). Each of the latter cases represents reasonable use jurisdictions. The *Meeker* court changed from the absolute rule to the reasonable use rule in a Problem Case 18 situation thus preventing the use by the city of the water from the well property without paying damages.

[112] 469 S.W.2d at 867.

[113] *Id. Cf.* State v. Michels Pipeline Construction, Inc., 63 Wisc. 2d 278, 217 N.W.2d 339 (1974) for extended analysis of *stare decisis* as applied to groundwater doctrines.

[114] 469 S.W.2d at 868.

> plaintiffs of the beneficial use of the normal water table to their immediate injury and to the eventual impoverishment of their lands.[115]

Then citing *Shenk v. Ann Arbor*[116] and *Canada v. Shawnee,*[117] the court explained its interpretation of the reasonable use rule as requiring the defendant to withdraw the groundwater so as not to interfere with the plaintiff's beneficial use of such water.[118] Application of the same rule to groundwater as used for streams provides a legal standard by which water resources may be allocated equitably and beneficially among competing users. The court also noted that the application of such a legal standard would give recognition to the established interrelationship between surface and groundwater and would bring into one legal classification most waters over which there might arise some controversy—perhaps a bold hope. At least, the court recognized the physical facts. The Missouri court goes further than the New York court did in *Forbell* in rejecting the absolute rule, but does so for similar reasons. Facing the knowledge issue squarely in relating its rationale for its decision, the court stated that since:

> The science of groundwater hydrology has come into existence, it has proven the postulates of the common law rule to be unsound. The premise that the owner of the soil owns all that lies beneath the surface so that he may use the percolating water in any way he chooses without liability to an adjoining owner fails to recognize that the supply of groundwater is limited, and that the first inherent limitation on water right is the availability of the supply.
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> . . . .
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> Modern knowledge and techniques have discredited this premise also. The movement, supply, rate of evaporation and many other physical characteristics of groundwater are now readily determinable. . . . At the time the City acquired the well and water treatment sites, it had full knowledge of the dimensions of the underlying aquifer, the volume of groundwater it contained, the daily rate of recharge, the direction and rate of flow, the normal water level and, at the rate of capture contemplated by the City, the level to which the groundwater would be lowered. *The City cannot be permitted to escape liability by appeals to a doctrine which assumes that the very information the City has acted upon was not available to it.* (emphasis added)[119]

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[115] *Id.* at 870, *citing* Katz v. Walkinshaw, 141 Cal. 116, 74 Pac. 766 (1902). *See generally* 59 AM. JUR. *Waters* § 118 (1962); Annot., 31 A.L.R. 908 (1924), for the proposition that the transportation of water away from producing land for the purpose of commercial use is injury to overlying groundwater basin owners.

[116] 196 Mich. 75, 163 N.W. 109 (1917).

[117] 197 Okla. 53, 64 P.2d 694 (1937).

[118] 469 S.W.2d at 870. *See also* RESTATEMENT (SECOND) OF TORTS § 858A at 153 (Tent. Draft No. 17, 1973).

[119] 469 S.W.2d at 870.

Thus, the Missouri court rejected the absolute rule,[120] partially for the same reasons that Judge Brinkerhoff adopted it in *Frazier.*

Next for consideration is the situation of two interfering pumpers which are both privately owned, a situation analogous to that presented in *Frazier,* but in a more modern setting. In 1963 in Delaware, the Court of Chancery was presented with the case of *MacArtor v. Graylyn Crest III Swim Club.*[121] The plaintiff, MacArtor, lived in a suburban area and had a well for domestic use which was only four feet deep. The defendant swim club, on leased property across the road, built a pool about 150 feet from the plaintiff's house.[122]

The swim club needed 240,000 gallons to fill its pool, but once filled did not require massive amounts of water throughout the year. When the swim club pumped, the MacArtor well went dry. The court found that the MacArtor well was objectively marginal for domestic use while the defendant's well, though substantial, used more than a normal household. It considered the problem of balance of interests, finding equity on both sides. It applied the test of "objective reasonableness" to the allocation of rights in groundwater and decided a number of issues regarding what constituted reasonable use as between two private owners, *viz:*

1. That the court may consider the intention of the injurer.
2. That recreational use of groundwater is a reasonable use.
3. That the plaintiff is not entitled to have the use of the deep well enjoined merely because the defendant could purchase water commercially at reasonable rates.
4. That prior use of groundwater does not automatically preempt other use, *i.e.,* the court rejected the appropriation doctrine.
5. That the comparative number of users of water produced may be a relevant factor in the consideration of what is reasonable use.
6. That as a general rule, a landowner may make reasonable use of groundwater.

It imposed a seldom used solution to the problem, ordering the plaintiff either to deepen his well with costs to be split between the plaintiff and the defendant, or to connect to the commercial supplier, the Suburban Water Company. If the plaintiff chose to deepen his well, the court ordered that he

[120] *But see* Jones v. Oz-Ark-Val Poultry Co., 228 Ark. 76, 306 S.W.2d 111 (1957) (for similar results between private owners with a strong dissent).

[121] 41 Del. Ch. 26, 187 A.2d 417 (1963).

[122] The defendant sunk a well 200 feet deep which incidentally penetrated solid rock at 42 feet and was cased in steel to the surface from that depth. Testimony from groundwater geologists on both sides confirmed that both wells tapped the same source of groundwater in spite of the difference in depths.

must bear the risk of deepening it, that is if no water is produced, it would be his loss. In addition, it ordered the defendant to pay for the water to be supplied the plaintiff in the interim.[123]

Compared with the decision of the Vermont court in *Drinkwine*, the decision of the Delaware court has much to recommend it in terms of actually solving the problem of competitive groundwater supply use. In making the decision, the court adopted a reasonable use rule, apparently without anguish, stating simply that:

> The doctrine of "reasonable user" commends itself here. This rule permits the court to consider and evaluate the various factors on both sides and arrive at an "accomodation" of the conflicting rights, if that is feasible. It also permits the court to consider the intentions of the offending party and his actions subsequent to the discovery of the consequences of his use of the water.[124]

Thus, it appears the court was willing to accept the responsibility of making a decision in spite of the fact that there was no prior knowledge of the effect of the establishment of the new well, as there was in *Higday*. It did not resort to the "easy out" of declaring the subject matter too mysterious to consider, nor did it simply say that there was no liability for such damage.[125]

Similar problems of interference have occurred in Ohio in recent years where the "rule of the biggest pump" has caused unresolved conflict and damage. Since 1970 industrial pumpers in and about Van Wert, Ohio, have drastically lowered the water table forcing residents to lower their pumps or drill new wells.[126] Investigation showed that in the Van Wert area there are two shallow rock units, the unconsolidated glacial deposits of clay, sand and gravel and the bedrock formations of limestone and dolomite. The glacial deposits cover the entire area and range in thickness from 15 to 145 feet. These deposits are considered a poor source of water, capable of yielding meager domestic supplies locally. The water capacity of the limestone bedrock varies, but generally is a good source. The majority of domestic wells yield adequate

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[123] The result would be entirely different through the use of the interpretation of the reasonable use rule as stated in the RESTATEMENT (SECOND) OF TORTS § 858A, at 154 (Tent. Draft No. 17, 1973).

[124] 41 Del. Ch. at 27, 187 A.2d at 419.

[125] In Iowa, which has a permit system, similar solutions to groundwater supply problems are reached through administratively encouraged compromise.

[126] H. EAGON, REPORT OF INVESTIGATION, GROUND-WATER LEVELS IN THE VICINITY OF VAN WERT, VAN WERT COUNTY, OHIO (1973). The situation sparked alarm. There had been increased groundwater usage by industry in Van Wert and it was feared that continued unrestrained withdrawals from the limestone aquifer would result in depletion and hardship to area residents. An investigation was requested in 1972 by the Division of Water of the Ohio Department of Natural Resources with the support of Congressman Latta, the Director of the Ohio Department of Health and the Ohio EPA.

water at depths between 80 and 150 feet. Wells yielding 100 to 300 gpm can be developed by drilling the full thickness of the limestone, about 400 feet. Below that there is an unproductive shale aquiclude. In the limestone, the water moves through complex systems of joints, fractures and channels at a rate of a few feet per day and generally from the southwest to the northeast, as is shown by the gradient of the water table elevation.[127] The main source of recharge is from regional flow and precipitation which seeps through the glacial materials into the limestone aquifer.

The geologic study dealt with two main questions: (1) did new and increased pumping by industry cause the lowering of the water level in the Van Wert area?; and, (2) would the water levels continue to decline? Because domestic and small commercial pumping generally affected the levels so little this might go unnoticed. However, municipal and industrial pumping centers developed strong draw-down,[128] the shape of the cone depending on the location and intensity of pumping centers. It was possible to reconstruct the water level for the period before the heavy industrial pumpers began. It was estimated that pumping by industries averaged between 600 and 700 thousand gallons per day during the 13-year period before 1972. By 1972 the conditions had affected a substantial section of the Van Wert area.[129] The cone of influence affected an area of about 18 square miles, and the withdrawal was up to about one million gallons per day or about three acre feet per day. The significant decline between 1968 and 1972 can be seen[130] in the northwest portion of Van Wert where groundwater levels declined as much as 40 feet. A lowering of as much as 10 feet encompassed an area of about four square miles. The investigation predicted further reductions during the next extended period of deficient precipitation.[131]

As a result, some citizens of Ohio were faced with serious problems of depletion of their water supply or redevelopment at excessive cost in the Van Wert area to the benefit of others. If the City of Van Wert were still

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[127] *See* Appendix B, fig. 6.

[128] ***See* Appendix B, fig. 7.**

[129] *See* Appendix B, figs. 6, 7.

[130] ***See* Appendix B, fig. 8.**

[131] As a result of the study, two serious problems were indicated. First, many of the industrial wells penetrate the thickness of the limestone aquifer where pumping is believed to range between the 90- and 250-foot-depth levels. In limestone aquifers, water generally enters through a few discrete zones rather than uniformly through the entire footage of the borehole. The discrete zones will define a critical pumping level, which if exceeded, will result in excessive drawdown and loss of well capacity. Lowering the cone just a few feet could cause great reduction in yield. Secondly, in the case of shallow wells, several individuals already had to lower pumps, deepen wells or drill new wells. Some well systems have been rendered inadequate; others will experience difficulties as the region develops. Thus the small water user finds himself in conflict with large users and although water is available at depth, it becomes more costly to obtain.

relying on a groundwater supply, there could be a general crisis affecting the health and welfare of a substantial portion of the city's population. Applying the absolute rule, there is no recourse. Yet following the reasoning of the courts in *Forbell* and *Higday,* and from a general knowledge of business practices, it is more than reasonable to assume that the industrial pumpers knew, or should have known, what water supply was available before they invested large sums of money in exploiting it. Drilling costs average 10 to 20 dollars per foot. Furthermore, they knew or should have known that their large demands would draw down the water table to the injury of neighboring shallow wells. Thus, the reasoning of Judge Brinkerhoff in 1861, is inadequate when applied to the situation in Van Wert. Rather, a thorough up-to-date analysis should find that the extent and availability of the water supply in Van Wert is amenable to determination by applicable scientific and engineering principles; that the promotion of the general welfare requires that a limited water supply be shared in some reasonable manner; and, that in order to protect the established interests and needs of the citizens of Van Wert, another doctrine—reasonable use, correlative rights, appropriation or even the Restatement of Torts approach—should be applied in Ohio.

Problem Case 2 Interference with a flowing spring fed by a groundwater supply by pumping of a well.[132]

A groundwater-fed spring is reduced or cut off by the lowering of the groundwater table as the result of establishment and pumping of a new well. This was the physical situation which led to the landmark Ohio Supreme Court decision in *Frazier* which established the absolute rule as the basic doctrine of common law on groundwater in Ohio.

In many court cases it is difficult to distinguish between a natural spring and one which has been improved into a water supply as a dug well. Physically, a spring is the intersection of the groundwater table with the surface of the land where water issues at some discrete point.[133] As noted previously, *Frazier* is a Problem Case 2 as is *Logan Gas* and *Drinkwine,* depending on how one reads the facts. One of the older, often cited cases within this problem area is *Chatfield v. Wilson,*[134] in the State of Vermont, where the court found that groundwater was too secret and changeable to be regulated by law. Basically, Problem Case 2 situations are not much different from Case 1 situations unless there is a problem of definition. The problems of definition can occur in two ways. On the one hand, one of the disputants may claim that the well is fed by

[132] *See* Appendix B, fig. 9.

[133] Seepage into streams from the groundwater, a similar physical situation, is not one usually described as a spring, at least not in the legal literature. As a result, some cases appear to consider situations described as interference with a spring; others as interference with a well or use both terms in the same case for the same source of water.

[134] 28 Vt. 49 (1855).

an underground stream, in which case the law applied is different in an absolute doctrine jurisdiction. On the other hand, the court may consider the spring to be part of a stream, if it in fact begins a stream, and hence it will be subject to riparian laws rather than those applied to groundwater. All of this makes little sense from a hydrologic standpoint and is simply grist for the legal mill.

Problem Case 3 Interference with groundwater supply by surface excavation below the water table (quarry, strip mine, etc.).[135]

The original water table at a high level is lowered by the excavation to a lower level where springs develop at the interface of the excavation (road cut) and the water flows out into the cut. This is analogous to the situation in *Elster,*[136] except that the ditching there was for a sewer project and the ditch was later filled in. The situation occurs frequently and has been litigated many times, especially in situations where the excavation has affected domestic water supplies. As in Problem Case 1, a number of approaches have been used by courts to resolve the dispute.[137]

In *Bayer v. Nello L. Teer Co.,*[138] the Supreme Court of North Carolina considered a situation where a quarry operation interfered with the plaintiff's groundwater supply. The court felt it could not extend liability in a reasonable use jurisdiction. In *Nello,* which might be considered a Problem Case 16 situation or even a pollution problem, the defendant's open pit quarrying went below the water table. Pumps were installed to dewater the quarry and as a result the water in the plaintiff's well became salty and unusable. The court found that all the evidence showed that the defendant was mining in accordance with the best practices and pumped no more groundwater than was necessary for the operation in a useful and beneficial way, and hence was not wasting any.[139] Since there was no evidence of waste or of intentional contamination or interference with the plaintiff's supply of groundwater, nor evidence of malice or negligence, the court found that the defendant's motion for judgment of involuntary nonsuit made at the close of all evidence in the trial court was improperly overruled. The court did not feel that the defendant was required to let its rock quarry remain unworked because of groundwater

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[135] *See* Appendix B, fig. 10.

[136] 49 Ohio St. 82, 30 N.E. 274 (1892).

[137] *Id.*

[138] 188 N.C. 1, 123 S.E. 482 (1924). *See also* Annot., 35 A.L.R. 1203 (1925).

[139] *Contra,* RESTATEMENT (SECOND) OF TORTS 858A, at 159 (Tent. Draft No. 17, 1973), explaining the meanings of reasonable and unreasonable use: "Very serious harm can occur where salt water intrudes into fresh water aquifers. . . . Usually these effects result from combined withdrawals of many persons, but they may be caused by a single large operation. In latter cases, the harm caused to groundwater users whose withdrawals do not materially contribute to the salt water intrusion is unreasonable." However good legal reasoning may be, the statement may not be a significant one hydrologically.

inflow in order to protect the underground water supply of the plaintiff.[140]

When the State of Vermont was constructing a highway and interfering with a water supply the Vermont court saw the situation differently. In *Winooski v. State Highway Board,*[141] the Vermont State Highway Department, exercising eminent domain, took 3.4 acres of plaintiff's 49 acres for highway construction. After construction began, Winooski lost a well field west of the condemned parcel and the wells failed to produce. The lower court dismissed the case. However, the Supreme Court of Vermont, in an absolute rule jurisdiction, said that "[i]f substantial evidence brought forth to satisfy the triers of fact that the loss of a property right was caused by the taking of land for highway purposes, the consequential damage is recoverable..."[142] in spite of the more general rule that percolating water is found to be "secret, changeable and uncontrollable" as set forth in *Chatfield,* the leading Vermont precedent.

The outcome is interesting, because in an absolute rule jurisdiction where water rights are property rights, the injured party gets compensation,[143] while in a reasonable use rule jurisdiction there is generally no recognition of damage because the property owner is using the land reasonably. The factor of a state taking is probably significant, *i.e.,* as between two private owners, it is unlikely that the outcome would be the same.

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[140] *Contra,* Parker v. Boston & Maine R.R., 3 Cush. 107 (1849) where the railroad, involved in construction excavations for its roadbed, interfered with plaintiff's spring. The court found that the railroad, although armed with eminent domain, was answerable to the owner of the spring it destroyed on the ground that the "destruction of the spring was not required for the purposes of the owner of the land through which the excavation was made." At the same time, the court fully recognized that each landowner had the right to make proper use of this land and that sinking a well is a proper use resulting in no liability. Interestingly, the court ignored the knowledge question applying a rather strict liability to the railroad once it had determined that there was no need by the landowner for this activity. *See also* BEUSCHER *supra* note 6, at 35. *But see* Rouse v. Kingston, 188 N.C.1, 123 S.E. 482 (1924), distinguished by the Nello court, where the City of Kingston had dug artesian wells and conveyed groundwater to the city for sale to its inhabitants for domestic use and fire protection. Clearly, the North Carolina court is not looking at the interference in terms of the physical situation but instead is looking at the subsequent use of the produced water. *See also* Annot., 35 A.L.R. 1203 (1925).

In California, where under the correlative rights doctrine, the Alameda County Water District obtained an injunction against Niles Sand and Gravel Company to prevent the defendant from pumping water from gravel pits where this was a detriment to the specified water basin and a detriment to the restorative program of the county as trustee for all the surface owners in the basin. Alameda County Water Dist. v. Niles Sand & Gravel Co., Inc., 37 Cal. App. 3d 924, 112 Cal. Rptr. 846 (1974).

[141] 124 Vt. 496, 207 A.2d 255 (1965).

[142] *Id.* at 500-01, 207 A.2d at 259.

[143] Damages are paid for loss of groundwater where the public agency has taken some part of the land of the person who has lost his groundwater supply. These consequential damages are paid as the required compensation for the taking of the land. Tennessee Gas Transmission Co. v. Wolfe, 159 Ohio St. 391, 122 N.E. 376 (1953). But not under the rule in Frazier v. Brown, 12 Ohio St. 294 (1861), if the land is not actually taken.

More recently in the case of *Labruzzo v. Atlantic Dredging and Const. Co.*,[144] the Florida court approached the question of liability as a case governed by the law of torts solely, and not one of groundwater law. In *Labruzzo*, the complaint alleged that the construction company, by negligently dredging a yacht basin, had permanently diverted and destroyed a spring and diverted an underground stream from its natural channel. The existence of the underground stream was stipulated! The lower court agreed that the complaint stated a cause of action for intentional invasion of water rights, but the Supreme Court of Florida reversed the decision finding that, in the absence of surface indication, an interference with subterranean water is unintentional and damage is without injury unless the conduct is the result of negligence or reckless or ultrahazardous activity. Nonetheless, the court held that "[p]roperty rights to . . . waters that naturally percolate are correlative, each landowner is restricted to a reasonable use of his property."[145] The question in *Labruzzo* turned on knowledge. If the contractor had no knowledge of the possibility or probability of his interfering with the plaintiff's water, then he had no duty to take precautions. If he did know, and the foreseeable result of the dredging would be to interrupt the underground stream, then he had a duty. The mere general knowledge of the subsurface conditions would not suffice and the court spoke squarely to that point when it found:

> A complaint alleging that waters which formed a spring on the plaintiff's land flowed in an underground stream under defendants adjacent land, and that defendant knew or should have known that the area was underlain by limestone strata which was commonly pierced with water courses, and that defendant negligently excavated on its property and thereby interrupted . . . the natural flow . . . was insufficient to state a cause of action.[146]

The court did not find that the excavations were ultrahazardous or that the defendant had acted recklessly.

The question of knowledge is even more difficult when dealing with excavations which interfere with groundwater supplies than the situation where two wells are interfering. Simply, this is due to the fact that the excavator's activity may be totally unrelated to any consideration of water supplies and he indeed may be as surprised to find substantial water in his excavation as the owner of the well or spring is surprised to find his well has gone dry. Also the resultant expense to each may be substantial.

Both case and statutory law have placed a burden on the strip miner who interferes with a water supply or who damages it with polluting substances.

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[144] 54 So.2d 673 (Fla. 1951).
[145] *Id.*
[146] *Id.*

Ohio Revised Code Section 1513.15 creates a legal remedy for interference with a legitimate use of groundwater by a strip mine operator.[147] Pennsylvania case law is similar, but rests upon another basis. In *Bumbarger v. Walker,*[148] the court held that the ruination of a spring fed by groundwater as the result of blasting in a strip mine 2,250 feet away and about 100 feet higher, such that the level of the water was affected and the water became polluted with high sulfur content and unfit for use, made the defendant liable. In spite of the general rule recognized by the court that an interferor is not liable for disturbing groundwater by mining, the general verdict for the plaintiff was sustained on the basis that the blasting was an ultrahazardous activity. The dissent objected that this constituted an unwarranted extension of the doctrine of tort liability; was contrary to the established law on liability for interference with groundwater; was unforeseeable and hence the defendant was not negligent; and, that the plaintiff did not establish concussion damage.[149]

The Problem Case 3 situation occurs relatively frequently in Ohio. The Department of Natural Resources, Division of Geological Survey, has undertaken numerous studies which involve this type of interference, especially in the situations of gravel pit operations, which naturally lowers the groundwater table, or instances where there is pumping.[150] In addition, the Ohio Department of Highways receives numerous complaints from landowners along the route of new highway construction that their domestic

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[147] OHIO REV. CODE ANN. § 1513.15(c) (Page 1974) reads in pertinent part:

> An owner of real property who obtains all or part of his supply for domestic, industrial, agricultural or other legitimate use from an underground source other than a subterranean stream having a permanent, distinct and known channel, may maintain an action against an operator to recover damages for contamination, diminution or interruption of such water supply, proximately resulting from strip mining.

[148] 193 Pa. Super. 301, 164 A.2d 145 (1960).

[149] ***But see*** Western Geophysical Co. of America v. Mason, 402 S.W.2d 657 (Ark., 1966), where defendant company was held strictly liable for damages to a water well from explosions used for geophysical prospecting; no showing of negligence necessary. *See also* O'Brien v. Primm, 243 Ark. 186, 419 S.W.2d 323 (1967) defendant company held liable for damage to a water well 550 feet from the oil well and 2,000 feet above it as a result of a "sand frac" and acidizing treatment, in spite of expert testimony that the casing was intact and the cement would prevent contamination of the water well. The "frac job" physically lifts the subsurface strata and expands natural fractures. This result notwithstanding the general rule that oil well operations are *per se* a nuisance. *See, e.g.,* Cline v. Kirkbride, 12 Ohio C.D. 517 (1901); Fairfax Oil Co. v. Bolinger, 186 Okla. 20, 97 P.2d 574 (1939). But more in line with the rule that while there is a legal right to carry on drilling operations, no one has the right to produce substantial physical damage through vibrations, British-American Oil Producing Co. v. McClain, 191 Okla. 40, 126 P.2d 530 (1942).

[150] H. EAGON, REPORT OF INVESTIGATION, GROUND-WATER LEVELS IN THE FOREST HILLS AREA NEAR SPRINGFIELD, CLARK COUNTY (1972); H. EAGON, REPORT OF INVESTIGATION, POSSIBLE EFFECTS OF PROPOSED GRAVEL PIT OPERATION ON GROUND WATER, SECTION 20 SALEM TOWNSHIP, SHELBY COUNTY (1972).

wells have gone dry.[151] Investigation of these complaints by the Geological Survey has substantiated a number of them. The informal policy of the Department of Highways has been to compensate some landowners, drill new wells in singular cases, or ignore the complaint, depending on the recommendations of the division engineer, the amount of adverse publicity attendant, and whether there was additional property to be acquired for the right of way in the area. The Highway Department customarily makes no survey before construction begins which potentially could cause water supply interference problems, nor does it check the level of wells near the proposed road so that it can have a baseline of preconstruction information.[152]

Problem Case 4 Interference with groundwater supply by reducing pressure in the storage reservoir; same supply present.[153]

In this situation a water well, tapping a confined aquifer, receives reduced flow after construction of a gas storage reservoir in the same confined aquifer. As illustrated, the confined aquifer is fed from surface infiltration and lake seepage. After the gas storage facility is established in the pores of the sandstone reservoir, the pressure of the gas interferes with the free downward flow of the groundwater towards the water well.

The specific situation apparently has not yet been litigated. However, situations which resemble it have been touched on by the courts. In *Erickson v. Crookston Waterworks Power & Light Co.*,[154] general principles were established which could be applied to this type of groundwater problem. In *Erickson,* which actually is a Problem Case 1 situation, one of the questions addressed by the Minnesota court was the maintenance of water levels in the plaintiff's well. The court found that the maintenance of the water level was proper. However reasonable this may be legally, water level maintenance is physically impractical, if not impossible in many instances, and contrary to the concept of the use of the water.[155] "Safe yield" is a separate matter.

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[151] A. WALKER, HIGHWAY CONSTRUCTION, NEW AND SUNFISH TOWNSHIPS, PIKE COUNTY (1973).

[152] OHIO LEGISLATIVE SERVICE COMM'N, "DE-WATERING" BY PUBLIC AGENCIES, Report No. 3, at 5 (1974), states:

> . . . the Department's policy during at least the past 10 years has been simply to evaluate each complaint of water loss, and to pay damages if the Department finds that the highway project caused the loss—making no point to distinguish whether there has been a "taking" or not under the principles of eminent domain law. The Department has no formal complaint procedure, and there is no appeal from the Department's decision, other than to file an action in mandamus or injunction, or to file a claim with the Sundry Claims Board [now Court of Claims].

[153] *See* Appendix B, fig. 11.

[154] 105 Minn. 182, 117 N.W. 435 (1908).

[155] *See, supra* note 6. *Contra,* RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1973): "A possessor of land . . . who withdraws groundwater . . . is not subject to liability . . . unless: (a) The withdrawal of water causes unreasonable harm through

A principal case close to the problem is *Current Creek Irrigation Co. v. Andrews,*[156] in which the central questions were (1) whether a prior appropriator of water from an underground basin who received it by means of flowing wells and springs had a vested right to continue to receive the water by artesian pressure; and, (2) whether subsequent appropriators, whose withdrawals of water lowered the water table and reduced the flow must restore the pressure or bear the expense of replacing the water of prior appropriators. While it was held that this is a right of the prior appropriator and provides an economic solution, it does not necessarily imply a satisfactory technological one.

Thus, while neither case directly speaks to the Problem Case 4 under discussion, a helpful analogy may be extended.

Problem Case 5 Interference with groundwater supply by pumping from mines.[157]

The situation envisioned is one in which groundwater floods or interferes with a mining operation to the extent that it is necessary to pump the mine. This is a common natural occurrence and pumping is often a necessity. The case illustrated shows a coal mine with an original groundwater table in a sandstone formation. Extraction of the coal proceeds until a point is reached where the shaft encounters the overlying sandstone which has cut down into the coal lower than elsewhere in the mine as part of the depositional history of the sandstone. The transmissibility of the sandstone is greater than that of clay and limestone, normally overlying the coal, and the water pours into the mine. The subsequent pumping to clear the mine lowers the water table faster and causes the water well to fail.

It is not clear from the reports about the case that *Acton v. Blundell*[158] was concerned exactly with a Problem Case 5 situation, inasmuch as it could be a Problem Case 6. Nevertheless, it is close enough to warrant comment here because *Acton,* heard in 1843, is *the* English court case which set the absolute rule by holding that the defendant has a right to sink coal pits on his own land, although he thereby drained a well on the plaintiff's land. The decision is closer to the Problem Case 3 situations of excavations

lowering the water table or reducing artesian pressure"; and comment to § 858A, Clause (a) at 157: "There is usually enough water for all users, and the problem is one of drilling a new deep well, installing a pump, paying increased pumping costs, or obtaining water from an alternate source." The "improvement" of the law in the Restatement Tentative Draft does not seem to allocate risk in a fashion any less arbitrary than the law of capture and points up the fact that groundwater supply management requires knowledge and controls.

[156] 9 Utah 2d 324, 344 P.2d 258 (1959).

[157] *See* Appendix B, fig. 12.

[158] 152 Eng. Rep. 1223 (1843), which was relied upon by the *Frazier* court as establishing the absolute rule.

interfering with water supplies than those of Case 1, interference of two pumpers for which it is cited as support in so many cases.

The famous early American case comes not surprisingly from Pennsylvania. In *Wheatley v. Baugh*,[159] the plaintiff (defendant in error), a tanner, maintained a spring of water, from which he obtained supplies to use in tanning hides. In 1852, a valuable copper mine was discovered on the adjacent farm. Defendant sunk a shaft and installed pumps to remove the water which interfered with the mining operations. Later, larger pumps were put in and in about two weeks Baugh's spring ceased to flow. When the pumps were stopped for a short period, the spring began to flow again. The distance from the spring to mine's mouth was 550 yards and uphill 50 feet. The issue before the court was one of proper damages. The court reviewed the absolute rule and its relation to property under a discussion of the maxim *"cujus est solum . . ."* and the reasonable use rule under the maxim *"sic utere tuo ut alienum non laedas."* It then discussed and cited Roman law and European civil codes and earlier American and English cases, concluding that there was no evidence showing "that the mining company had been guilty of anything beyond the proper use of their own property. The plaintiff below [downhill] had therefore no cause of action, and the jury ought to have been so instructed."[160]

Judge Lewis gave two interesting reasons for his opinion which sound familiar. His first reason was that, in conducting extensive mining operations, it is, in general, impossible to preserve the flow of groundwater through the pores of the rock and many springs must of necessity be destroyed. While his grasp of the hydrologic situation is probably correct, it is not so clear why poor Baugh had to give up his water and perhaps his tanning business so that Wheatley could mine copper. What is clear is that Baugh suffered economic loss to Wheatley's benefit.

His second reason was, that in his estimation, the public interest was greatly promoted by protecting what he called the "perfect right" as opposed to an "imperfect right." He felt that the spring owner had an imperfect right to the supply, which was derived through his neighbor's land as compared with the absolute right to take the minerals, and consequently expressed the opinion that "the imperfect rights and lesser advantage should give place to that which is perfect and infinitely the most beneficial to individuals and to the community in general."[161]

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[159] 25 Pa. 528 (1855).

[160] *Id.* at 536.

[161] 25 Pa. at 535. *But see* RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1973). Query? Should the law recognize a greater right to mine than to use groundwater? Is mineral scarcity a factor or is it just the rule of capture operating? What if water is scarce? Compare the risk allocation between groundwater and surface stream users in Problem Case 18. Is knowledge the turning point?

Nevertheless, the holding in *Wheatley* has been consistently followed in many jurisdictions. In Ohio, it was confirmed without report in *Wills Creek Coal Co. v. Stage,*[162] which is reported in passing in *Collieries.*[163] In *Wills Creek* the charge from the trial court, affirmed by the supreme court without report read as follows:

> If you find that the defendant in mining out that coal, reasonably and in a proper manner, and to a reasonable and proper extent, and without intending to do so, in the coal tapped the sources of water in that well, and destroyed and diverted the same, then the company is not liable for the destruction of the well. . . .[164]

The difference between *Wheatley* and *Wills Creek Coal* is, of course, the difference between Problem Case 5 and 6; it is the latter to which *Wills Creek Coal* belongs. Such cases are not widely reported as water rights cases and more may be found under listings for mining disputes.[165]

Problem Case 6 Interference with groundwater supply by changing flow lines due to subsurface mining.[166]

The Problem Case 6 situation is very close to that of Case 5, in that the reduction of the water table is a result of change in the flow pattern of the groundwater. Subsequent pumping to maintain the operation of the mine simply accelerates the lowering or rate of interference with the groundwater and enhances the degree of interference with the neighboring groundwater supply. As noted, the case of *Acton* may be a Problem Case 6 situation but it is not entirely clear from the facts. It is the belief here that no difference between Case 5 and Case 6 situations would be recognized by the courts in an absolute or reasonable use rule jurisdiction. In an appropriation rule court, it is possible that the senior appropriator might have a cause of action as might a permit holder in a permit state. In a correlative rights jurisdiction there would be an accommodation presumably. All this assumes the issue before the court would be one of water rights.[167]

Problem Case 7 Interference permanently with groundwater supply by

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[162] 77 Ohio St. 643, 84 N.E. 1135 (1908).
[163] 107 Ohio St. 238, 140 N.E. 356 (1923).
[164] *Id.* at 259, 140 N.E. at 362.
[165] *See* 58 C.J.S. *Mines and Minerals* § 274 (1956): "As a general rule persons engaged in ordinary mining operations are not responsible for damages caused by diverting or destroying the flow of percolating waters," *citing* Sloss Sheffield Steel & Iron Co. v. Wilkes, 236 Ala. 173, 181 So. 276, 764 (1938). The opposite result appears when without reasonable need or wilfully or negligently wasted or if a result of failure to provide subjacent support which causes damage to the surface.
[166] *See* Appendix B, fig. 12.
[167] Probably the law of mining would prevail, but see the latest Restatement view *supra* note 138.

destruction of reservoir capacity owing to collapse of reservoir internally by mining of groundwater.[168]

This situation can occur in relatively deeply buried groundwater reservoirs which are mined to exhaustion for groundwater. An example would be the agricultural irrigation of the Great Valley of California. The overlying weight of the sediment in the valley is naturally counteracted by the pressure of the water in the pores of the sediment or rock.[169] If all water is removed (except capillary water), the counter balancing force is removed and the sediment will tend to compact. Once the grains are permanently compressed, then recharge of the water into the sediment will not expand them.[170] Consequently, complete mining of groundwater can collapse a reservoir. The illustration shows a small portion of where a well penetrates a sand reservoir before removal of water and after removal and compaction.

No cases were found in which this Problem Case was litigated, but this may be an oversight since the physical situation could have been part of an issue described in another way. It would most likely occur, or have occurred, in basins of relatively late geological age and thick sedimentary fill, such as many of the basins of California,[171] Washington, Oregon and along the Gulf Coast.[172]

Problem Case 8 Interference with groundwater supply by diversion of a stream from its original bed.[173]

In this situation, as illustrated, a canal is constructed for irrigation or transportation purposes using the upstream flow of the natural stream. The diversion lowers the groundwater table in the vicinity of the stream causing the well to go dry. Surprisingly, no cases were encountered in which this problem was directly litigated. It would seem logical that this kind of interference must have arisen and most likely during the time of the great canal building during the early part of the 19th century. Perhaps such disputes were

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[168] *See* Appendix B, fig. 13.

[169] Terzaghi, *Simple Tests Determine Hydrostatic Uplift,* 116 ENG. NEWS-RECORD 872 (1936).

[170] Hydraulic fracturing techniques lift the rock opening fractures and joints. It is unlikely that compacted grains, even without substantial cement, could be "unstuck."

[171] R. MEADE, COMPACTION OF SEDIMENTS UNDERLYING AREAS OF LAND SUBSIDENCE IN CENTRAL CALIFORNIA 497 (1968).

[172] It is not clear that this would be a dispute involving the law of groundwater inasmuch as the groundwater would be gone. Instead it could be a question of the ownership of space in the rock. The ownership of pores of a rock, in fact of underground space generally, is an increasingly important question, not to be considered here. General reference is made to RESTATEMENT (SECOND) OF TORTS § 159 (Tent. Draft No. 9, 1963), which speaks to trespass beneath the surface of the earth. *See also* NATIONAL ACADEMY OF SCIENCES, LEGAL, ECONOMIC AND ENERGY CONSIDERATIONS IN THE USE OF UNDERGROUND SPACE 121 (1974).

[173] *See* Appendix B, fig. 14.

considered in the framework of riparian rights to continue undiminished flow of the stream rather than a question of groundwater rights, if they did occur.

Problem Case 9 Interference with groundwater supply by diversion of water from a stream for use.[174]

The situation illustrated is that of diversion of water from a stream by a riparian owner which results in the lowering of the water table in the adjacent land, causing the well to go dry. No cases were found in which this situation was litigated. The reason for the lack of cases may be that the laws pertinent to surface water and groundwater in many states are so separate that combined complaints never progressed very far in the judicial process. Of course, in riparian states the river user has the right to a reasonable amount of water as a property right, while the property owner with the well, if in an absolute rule jurisdiction, has no right except to what he has captured. Even in a reasonable use rule state the well owner would have to prove the stream user's unreasonable (*i.e.*, wasteful, nonbeneficial, malicious) use.

Problem Case 10 Interference with groundwater supply by reducing the level of an artificial surface reservoir.[175]

The situation envisioned would be a rare occurrence. The circumstances illustrated are those where a dam impounds water, for example in the case of a municipal water supply, and owing to poor construction or possibly an earthquake, damage to the reservoir requires its abandonment, or at the minimum, a reduction in the water level behind the dam. In the meantime, an adjacent landowner has established a water supply from the groundwater seepage[176] at the higher water table level. The sequence of water table levels is: (1) original level of stream before construction of the dam; (2) level stable with more or less permanent lake level; and, (3) lower water table stable with lower impoundment level.

The situation was litigated in *Bullock v. Hanks*[177] in Utah and revolved around the question of a permit. Hanks, the State of Utah's engineer, had issued a permit to another party to which Bullock objected. An ancillary issue in the case, which is pertinent here, concerned the groundwater level. Bullock

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[174] *See* Appendix B, fig. 15.

[175] *See* Appendix B, fig. 16.

[176] SAX, *supra* note 6, at 213 states that seepage and spring water may be considered separately because water from these sources frequently does not meet the definition of water of a natural stream and in some states the appropriation or riparian rights attach only to natural stream waters. Thus non-stream waters may not be covered by general state law, or are a property right like groundwater. There is also a problem of "tributary" seepage which "eventually" will reach a stream and whether it should be considered part of the stream. *See generally* 93 C.J.S. *Waters* § 91 (1956) for rights in springs.

[177] 22 U.2d 308, 452 P.2d 866 (1969).

claimed that the additional diversion of impounded water allowed by the state engineer would lower the water table on his land, "dry up his pasture and meadows in the winter, and cause freezing of stock water."[178] Hanks responded that the plaintiff wanted not only the water rights decreed him (by appropriation), but demanded that "excess water be left undiverted so as to maintain the water table through the area." The Utah Supreme Court held that the plaintiff had no right to water percolating through the soil before it came onto the land or after it left it and hence had no right presumably to insist on a higher level of impounded water. The same principle might be extended to the Problem Case under discussion where the lowering of the impounded water was involuntary.

Problem Case 11 Interference with groundwater supply by surface drainage projects.[179]

The situation illustrated is for the reclamation of swampy areas where shallow wells tap the same interconnected water supply between the swamps and the groundwater. This could be a common situation in Florida or on Ohio's glacial terrain, and is analogous to the excavation and pumping of a quarry or a construction ditch (Problem Case 3) except that there is no excavation. The result of the pumping is to lower the water table below that depth reached by the well.

This case was litigated in Utah in 1959 in *N. M. Long & Co. v. Cannon-Papanikolas Const. Co.*[180] The suit was for damages and for injunctive relief based on the claim that the residential developers in the course of improving their land had drained water from within the adjoining lands of the plaintiffs. The construction company had 92 acres of land, a greater portion of which was swampy. They built drains to lower the water table and condition the land for building. The effect was to lower the water table, of course, and to deplete the plaintiff's water supply, obviously a very shallow one. Given the high probability of the existence of an objectively marginal well on the plaintiff's property and the obvious poor planning practice to allow residential development in a drained swamp, the district court held for the defendant. The Supreme Court of Utah, on appeal, held that the defendants were not obligated to anticipate that drainage of their land would result in reducing waters to other tract owners and the defendants did not have to permit their land to remain swampy for the purpose of protecting groundwater supplies of adjoining lands.[181]

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[178] *Id.* at 868.

[179] *See* Appendix B, fig. 17.

[180] 9 U.2d 307, 343 P.2d 1100 (1959).

[181] *But see* RESTATEMENT (SECOND) OF TORTS § 858A (Tent. Draft No. 17, 1973).

Problem Case 12 Interference with groundwater supply by paving or other change in the infiltration (recharge) area.[182]

The situation inherent in this case is one which occurs commonly in areas undergoing urbanization and is accompanied many times by increased flooding. As illustrated, the paving of the hilltop eliminates recharge and lowers the water table under that area. Such problems can be far more complex than illustrated because a recharge or infiltration area may be literally hundreds of miles from the site of production of water from a confined aquifer and may lie in another state or another country. The case was litigated in *Friedland v. State*[183] where interference not only reduced the infiltration rate but indeed did cause flooding. Under a reasonable use rule, the defendant was not found liable.

In *Friedland,* the State of New York had constructed a road in the catchment area and this resulted in decreased soil water adsorption. In a subsequent dry season, water was no longer able to penetrate the ground and sufficiently raise the water table. The lower water level caused the plaintiff's pond to stagnate and an excessive growth of algae occurred. In the wet season, the surface flow was more rapid and the runoff flooded the pond. The plaintiff desired damages for his pond. The court held that there was no unreasonable interference by the State of New York with groundwater. The result seems contrary to the results of other cases that are analogous in which the state was cited for "taking" or a trespass in the case of floodwaters.

Problem Case 13 Interference with groundwater supply by subsurface grouting or cementing in mines.

The case envisioned would doubtless be a rare one by itself. It is more likely to occur in a situation which developed in combination with Problem Cases involving mining and petroleum development. By analogy, it appears that in either an absolute or a reasonable use jurisdiction, as in the cases involving quarrying operations, the courts probably would focus on the reasonable use of the property by the owner and his alleged inability to predict that the grouting in his mine could affect the groundwater supply of neighboring wells.

Problem Case 14 Interference with groundwater supply by well drilling procedures such as mud programs.

The case described here is similar to Problem Cases 13 and 15. It does not involve the common effect of well programs which cause problems, namely the pollution of the groundwater supply with liquid or gaseous petroleum. The

[182] *See* Appendix B, fig. 18.
[183] 35 App. Div. 2d 755, 314 N.Y.S.2d 935 (1970).

illustration found in Appendix B, Fig. 11, can be extended to cover the present case by assuming the establishment of a gas storage field with drilling wells at the edge of the field. Owing to loss of circulation in a well, huge quantities of drilling mud or cement are forced down the wells which causes the disturbance of the groundwater flow.

Interestingly, a case was found which appears to consider the situation. In *Sycamore Coal Co. v. Stanley*,[184] the plaintiff (defendant in error, Stanley) brought an action against the coal company to recover damages for the destruction of a well on his land and received a verdict in the amount of $475.

The Stanley farm adjoined land on which the company had drilled a core hole to a depth of 28 feet about 60 feet from the farm. The coring or drilling was carried out to determine the thickness and quality of coal seams underlying the land, a standard exploration technique. The drilling caused the Stanleys' well level to drop. After filling the core hole with cement, the water rose in the Stanley well to a depth of 14 inches where it previously had a depth of 4½ feet. The Kentucky court found for the coal company, stating that:

> Here, the appellant was using its land in a legitimate manner, and it drilled the hole for a necessary and useful purpose. There is nothing in the proof tending to show that the injury to the appellee's well should have been anticipated by appellant, and there is no question of malice or waste.[185]

In Ohio, there is a statutory provision regarding the plugging and abandonment of an oil or gas well which passes through a potable water stratum.[186] The statute provides for bridging the hole a minimum of 50 feet below all potable water-bearing strata.[187] Further, there are provisions for casing wells so as to exclude all surface fresh or salt (connate) water from any part of the well from penetrating fresh water strata.[188] While these provisions do not directly speak to the Problem Case, they do provide a penalty[189] for their non-observance and very likely would be pertinent to any litigation of the facts about this type of occurrence and dispute.

Problem Case 15 Interference with groundwater supply by cavity utilization.

A situation could develop where groundwater flow would be impeded due to the establishment of a high pressure gas storage facility in the subsurface. The illustration in Appendix B, Fig. 11, covers this situation by simply considering the gas to be under pressure, a normal condition in such storage situations. No cases were discovered, which considered groundwater rights,

[184] 292 Ky. 168, 166 S.W.2d 293 (1942).
[185] *Id.* at 170, 166 S.W.2d at 294.
[186] OHIO REV. CODE ANN. § 1509.16 (Page Supp. 1973).
[187] OHIO REV. CODE ANN. § 1509.17 (Page Supp. 1973).
[188] *Id.*
[189] OHIO REV. CODE ANN. § 1509.99 (Page Supp. 1973).

where this situation had been considered in the courts. With the rapidly increasing use of cavities for the pumped storage of electricity, petroleum products, groundwater, surface water, gas and garbage, the possibility of dispute arises. It appears by analogy, that in either an absolute or reasonable use jurisdiction there would be no liability (lacking malice, strict liability imposed by statute, negligence, contract provisions, etc.) in a straightforward interference case.

In Ohio, the underground storage of gas is regulated by the state under the provisions of Chapter 4161 of the Ohio Revised Code. While there are extensive provisions for safeguarding against interference of gas storage facilities with regard to mines, none appear to be directly applicable to potable water supplies. The effects of federal legislation and regulations, made pursuant to the Safe Drinking Water Act of 1974, have not been analyzed in this context.[190]

Problem Case 16 Damage by encroachment of salt water into a freshwater supply along coast line.[191]

Salt water, being denser, does not mix easily with fresh water in a non-turbulent reservoir. Fresh-water lenses along the seacoast and on isolated oceanic islands or banks may exist to a depth below sea level seven times the height of the water lens above sea level. This established fact accounts for the possibility of early settlement of such cities as Nassau in the Bahamas. Pumping of the groundwater, however, may cause the salt water to be drawn into the well. Reestablishment of a completely sweet water reservoir, once contaminated with salt water, is extremely difficult owing to capillary pressure and ion exchange effects.

The situation was considered in the case of *City Mill Co. v. Honolulu Sewer & Water Co.*,[192] in 1929, in a permit situation. The petitioner, City Mill, had applied for a permit to drill a well which provided that if, in the opinion of the commission, the proposed work threatened the safety of the water of the area which would be drawn upon by such a well, the permit should be denied.[193]

City Mill wanted a well exploiting about 50,000 gallons a day. There were already 21 active wells drawing 8 million gallons a day in the basin. The application was denied on two grounds. First, the reason was given that the draft on the basin was already larger than the supply or infiltration and,

[190] Safe Drinking Water Act, 42 U.S.C.A. 300(g) (1974) requires the Administrator of the Environmental Protection Agency to set primary drinking water standards for various pollutants in water supplies of public water systems serving 15 or more connections, including supplies from groundwater. *See also* 40 Fed. Reg. 51, 11990-98, 1975.
[191] *See* Appendix B, fig. 19.
[192] 30 Haw. 912 (1929).
[193] *Id.* at 915.

second, that the salt content of the wells near the proposed location was already high, and that water from the proposed well would become too salty for domestic use resulting in the loss of the well. The issue came to the Hawaii court which addressed it as a "taking" question. The court stated:

> The question now before us is not whether or to what extent the Territory or its agent the sewer and water commission may regulate the boring or the operation . . . of artesian wells, but whether it may, without compensation . . . prohibit the . . . new well, while at the same time leaving all users of existing wells at liberty to draw water therefrom.[194]

In other words, the court seems to be asking the question of whether the appropriation doctrine is constitutional if one potential user is left out in the cold, or whether all landowners who could have a right to groundwater extraction are to be included to some extent under a rule similar to the correlative rights rule. Of course, the constitutionality of the appropriation rule had been affirmed in other states, wihout the qualifying requirement of saving water for potential users. However, Hawaii decided otherwise.

The Hawaii court found that if there had been any increase in the salinity of Honolulu's waters in the basin, it was not the fault of City Mill, but was done by the wells already in operation. The court felt that the remedy should be to reduce usage by those already obtaining groundwater, and not by wholly excluding the applicant from having his reasonable share. The court concludes with the observation that it would be abhorrent to a sense of justice, and in violation of the applicant's rights as a co-owner of the artesian basin's waters, to prevent him from using the water. The decision is most interesting because, in protecting the rights of City Mills, it shows a remarkable inability of the court to manage a water basin and is opposed to the *Raymond Basin* solution[195] arrived at later in California. It seems to adopt by inference the approval of the correlative rights rule and to consider untaken water property.

The case really does not speak to the other questions regarding salt water intrusion. There is no consideration of whether salt water intrusion could be considered a trespass, whether it is a natural substance, hence not a pollutant,[196] and other definitional problems. The order of the commission was set aside and the appellant's prayer for a permit granted upon reasonable specifications.

Similar cases might be expected from the State of Florida, California, and

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[194] *Id.* at 922.

[195] *See* BEUSCHER, *supra* note 6, at 53.

[196] *See* Pennsylvania Coal Co. v. Sanderson, 133 Pa. 126, 6 A. 453 (1886) (acid mine drainage is "from natural, not artificial causes" hence not a pollutant). *Contra,* RESTATEMENT (SECOND) OF TORTS § 858A, Comment *a* at 159 (Tent. Draft No. 17, 1973). "Harm caused to groundwater users whose withdrawals do not materially contribute to salt water intrusion (by a single operator) is unreasonable."

along both coastlines. It is well known that the City of New York has restricted large scale pumping on Long Island for decades to prevent salt water intrusion.

Problem Case 17 Interference with groundwater supply by rise in groundwater table from an artificial reservoir.[197]

The situation illustrated is the first phase of the sequence of events leading to a Problem Case 10 situation which involves the lowering of the reservoir. It is difficult to imagine the issue being raised if the result is that a greater water supply is made available. However, as illustrated here, if there is another use being made of the subsurface, which could be interfered with by raising the groundwater table, *e.g.*, flooding of a cave or mine, then the situation might result in litigation.

In theory the situation is similar to that considered in *Miksch,*[198] if in fact the damage is to the surface of the land. Following the reasoning of that court in holding the flooding a trespass,[199] or following the reasoning of *Rylands,* as relied upon in *Ball v. Nye,*[200] one is liable without other proof of negligence, *i.e.*, one is strictly liable.[201]

Problem Case 18 Interference with stream flow by use of groundwater.[202]

The case envisions the opposite situation of that considered in Problem Case 9. Both illustrate the common hydrologic situation where the stream and groundwater are interconnected. This Problem Case was litigated in Ohio in *Warder* and there the pumper was enjoined from taking groundwater to an extent that it would interfere with stream water. Apparently, the Ohio case is in line with decisions in many other jurisdictions, including those which adhere to the reasonable use and appropriation rules, generally finding a superior right to riparian use over that of groundwater usage.

In Connecticut in 1940, a dispute arose between two corporations which was resolved in *Hartford Rayon Corp. v. Cromwell Water Co.*[203] The plaintiff, praying for an injunction, had a dam on Dividend Brook in Rocky Hill, Connecticut, since 1924. The creek flowed at the rate of 2 million gallons per

[197] *See* Appendix B, fig. 20.
[198] 128 Ohio St. 169, 190 N.E. 387 (1934).
[199] *Contra,* Shanan v. Brown, 179 Ala. 425, 60 So. 891 (1913) where the owner of city lots constructed a lake by building a wall around several natural depressions on his land causing retardation in seepage of groundwater. It was held that the lower property owner owed no duty to the upper to afford drainage for unchanneled subsurface water, applying the "common enemy" doctrine. *See also* CALLAHAN *supra* note 24, at 40, *citing* Crawford v. Rambo, 44 Ohio St. 279, 7 N.E. 429 (1886) (stating the same rule for Ohio).
[200] 99 Mass. 582 (1868).
[201] *See also* Kall v. Carruthers, 59 Cal. App. 555, 211 P.43 (1922); Malliet v. Taylor, 78 Ore. 208, 152 P. 873 (1915).
[202] *See* Appendix B, fig. 21.
[203] 126 Conn. 194, 10 A.2d 587 (1940).

day and the Hartford Corporation used a considerable portion of that flow for half its needs and took the rest from three wells. The defendant supplied water to the town of Cromwell. Facing an inadequate and polluted water supply, the Cromwell Co. bought seven acres on Dividend Brook, one mile above the Hartford factory. Cromwell planned to sink a well 100 feet from the brook and withdraw 150,000 gallons per day. The court, citing *Greenleaf* as supportive of the absolute rule in the state, held that an injunction did not lie to prevent drilling a well on the basis that the groundwater would be captured before flowing into the stream, until it was proven that the well would divert the stream. Hence, there was no cause of action.

The case cited for the perfection of the absolute rule is *Chasemore v. Richards,*[204] a Problem Case 18 situation. In *Chasemore,* the opposite was held from that in *Cromwell.* It was stated that a land and mill owner had no right to a continued stream supply from percolating water as against the adjoining Town of Corydon, whose extensive well operations caused the loss of plaintiff's use. The court maintained this position even though the plaintiff claimed a prescriptive right of 60 years! Clearly, *Chasemore* is not the law in Ohio if *Warder* is, even though *Chasemore* is cited with favor by Judge Brinkerhoff as a basis for his decision in *Frazier.*

Likewise, in *Fire District No. 1 v. Graniteville Spring Water Co.,*[205] the Vermont court distinguished this Problem Case from the Problem Case 1 situation where it has consistently applied the absolute rule. There again, two corporations selling water came into conflict. The defendant held the water rights from the landowner to all but the flow from two natural springs on her land. The plaintiff sought an injunction to prevent diverting water on any part of the landowner's farm. The court relied, it said, on *Chatfield*[206] and *Chasemore* but managed to avert the absolute rule by applying a definition. It stated that "once spring water becomes a part of a stream the absolute rule ceases." Hence the lower owner has a right in the spring which flowed and the defendant was not allowed to divert it by drawing groundwater from the stream which flowed from the spring unless he could do so within his riparian right. The court thus distinguished their holding from the earlier one in *Chatfield.*

In New Jersey, the court in *Meeker v. East Orange,*[207] changed its rule when faced with the question of interference of 20 city artesian wells by

[204] 2 Hurl & Norman Rep. 982 (1857). Chasemore effectively overruled Dickenson v. Grand Junction Canal Co., 7 Exch. 282, 21 L.J. Exch. 241 (1852) where the defendant canal company operated a well on its own land to supply water to the summit of the divide. It pumped down the stream flow depriving the riparian mill owner of his normal flow.

[205] 103 Vt. 89, 152 A. 42 (1930).

[206] 28 Ut. 49 (1855).

[207] 77 N.J.L. 623, 74 A. 379 (1909).

Meeker's riparian rights to use Canoe Creek for a domestic supply by diverting groundwater before it entered the stream. Finding the reasoning upon which the English rule rests unsatisfactory and inconsistent with legal principles—in short, might makes right—the court adopted the reasonable use rule for New Jersey, thus preventing the city's exportation and sale of water to Meeker's detriment without liability for damage.

In appropriation rule states, there has been a similar outcome. In California[208] and Utah[209] the situation arose where the right of the landowner to take groundwater interfered with prior appropriator's rights on a nearby stream. In both states the courts prevented the use of the groundwater to the extent that such use interfered with the prior surface water use. In New York, a similar rule was adopted where the diversion of the groundwater was to land not within the basin.[210]

Problem Case 19 Interference with the level of a surface reservoir or lake by use of the groundwater supply.[211]

The case is similar to Problem Case 18, involving the same physical principles, but with the difference that the surface water level is the result of impoundment rather than stream flow. It is the opposite of Case 10 where the groundwater production is reduced as the result of the lowering of the reservoir.

The case has been litigated in England in *English v. Metropolitan Water Board,*[212] which is important for the absolute rule jurisdictions because of the civic nature of the defendant. The plaintiff claimed that the defendant's pumping station and water operations caused the subsoil water level to fall as a result of which his pools were drained. This rendered them worthless as a site for spawning fish and fishing grounds and as a place for the cultivation of watercress. The defendant was pumping 1 million gallons per day. The King's Bench decided for the defendant, agreeing that his operations did cause a substantial lowering of the water level, but saying that it was well established that the plaintiff had "no right of support" by water removed by the defendant on his own land.

Judging from the cases cited in the review of Problem Case 18, it

[208] Tulare Irrigation Dist. v. Lindsey-Strathmore Irrigation Dist., 3 Cal. 2d 489, 45 P.2d 972 (1935).

[209] Silver King Consol. Mining Co. v. Sutton, 85 Utah 297, 39 P.2d 682 (1934).

[210] Smith v. City of Brooklyn, 18 App. Div. 340, 46 N.Y.S. 141 (1897). Fortunately, the courts are not in competition for prizes. It is hard to see why interfering well owners in Vermont are not liable to one another because of lack of knowledge by the well owner of the secret and occult movement of groundwater but a well owner who interferes with stream water flow by pumping is liable. How is he to know that it is his well that is interfering? From a scientific standpoint, if the one is knowable, so is the other.

[211] *See* Appendix B, fig. 22.

[212] [1907] 1 K.B. 588. *See also* MYERS *supra* note 6, at 573.

would be reasonable to assume that the courts would not agree with the King's Bench in the United States, but would rule consistent with American decisions in analogous situations, restricting the groundwater user.[213]

Problem Case 20 Damage to mine from withdrawal of groundwater.[214]

The case outlined here is one in which removal of groundwater has the same effect on a mine as removal has on subsidence and collapse of surface features. The geological principles appear the same. In the illustration, the lowering of the groundwater table by pumping of three wells in the sandstone reservoir reduces the water table below the overlying limestone used for storage which then begins to dissolve it and form caves. The cave formation breaks through into the base of the overlying coal mine causing damage to the mine.

No cases were discovered in which this situation was litigated. It would seem likely to occur in a geographic area like Pennsylvania or West Virginia. If in an absolute rule or reasonable rule jurisdiction, it is questionable whether there would be a cause of action with regard to water rights. Inasmuch as the support removed, as illustrated, would be lateral support (from the standpoint of the pumper's land) it appears likely that the courts would not declare any liability.[215] Of course, the situation might be covered by regulation or statutory law.

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[213] *See* discussion Problem Case 18 *supra. Cf.* United States v. Cappaert, 375 F. Supp. 456 (Nev., 1974) where an injunction was held to lie which limited the pumping of a groundwater user to the detriment of the superior appropriation holder of a natural pool, the Devil's Hole. The superior holder, the United States, claimed the Devil's Hole pupfish was endangered by a drop in water level in the Hole owing to defendant's pumping. The court limited the pumping to the amount which maintained daily mean water level using the authority of the Endangered Species Act of 1973, 15 U.S.C. § 1531. *See also* U.S. v. 1,629.6 Acres of Land More or Less in Sussex Co., State of Delaware, 503 F.2d 764 (3d Cir. 1974) where it was held that no riparian rights accrued to property owner on an inlet formed by artificial means absent reliance on the use of the inlet that could be regarded as natural.

[214] *See* Appendix B, fig. 23.

[215] *See generally* 58 C.J.S. *Mines and Minerals* § 277 (1956). A surface owner is generally entitled to lateral support of his land in the natural state and an owner of land carrying on mining operations and depriving an adjoining owner of lateral support is liable for injuries to the land from such operations. *See also* RESTATEMENT (SECOND) OF TORTS § 818 (1939) "To the extent that a person is not liable for withdrawing subterranean waters from the land of another, he is not liable for a subsidence of the other's land which is caused by the withdrawal." *But see* RESTATEMENT (SECOND) OF TORTS § 818 (Tent. Draft No. 15, 1969): *Withdrawing Subterranean Substances.* "One who is privileged to withdraw subterranean water, oil, minerals or other substances from under the land of another is not for that reason privileged to cause a subsidence of the other's land by such withdrawal."

Note that the Tentative Draft would include subsurface property subject to damage. The reporter (at 2) states that he "is unable to see why there should be any distinction according to what the defendant has withdrawn [contrasting the holdings regarding withdrawal of water and mineral—no liability versus strict liability]. The

Problem Case 21 Damage to cavity utilization by withdrawal of groundwater.[216]

The case is identical to Problem Case 20, except that the cavity instead of being a mine, *i.e.*, the excavation of a mineral resource, is a place of storage (radioactive wastes,[217] garbage,[218] or valuable records). The damage to such storage cavities is potentially very dangerous in some parts of the United States. For example, the experimentation and proposed storage of highly toxic and very long life radioactive waste in salt mines near Lyons, Kansas, must be protected for hundreds of years from all groundwater (or other well) interference[219] or catastrophic health dangers could result. No case law was discovered involving this situation, but it appears that it may be a problem of grave concern in the near future.

Problem Case 22 Damage to overlying surface by withdrawal of groundwater.[220]

The case illustrated is one for a limestone terrain where the possibilities of removal of subsurface support by dissolution of carbonate rock are great. If dissolution proceeds to a sufficient extent, collapse features, which underground are recognized as caves, may extend to the surface causing sink holes. These are common in limestone terrain naturally, an example of which would be central Ohio. The situation has not been litigated in Ohio to the writer's knowledge. Analogous situations have been considered with disparate results, but generally, the courts have held that the overlying landowner is entitled to subsurface support of his land.[221]

In two cases involving mining in Virginia, *Couch v. Clinchfield Coal Corp.*,[222] and *Stonegap Colliery Co. v. Hamilton*,[223] the courts held that the

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Advisors and the Council, meeting the problem for the first time are in some doubt, but express themselves as willing to follow the majority of the cases," *i.e., contra* to the Tentative Draft statement and in accord with the old § 818 position.

[216] *See* Appendix B, fig. 24.

[217] *See* McClain, *Status for AEC Project to Establish a Salt Mine Radioactive Waste Repository*, in FOURTH SYMPOSIUM ON SALT 337-42 (A. Coogan ed. 1974) [hereinafter cited as McClain].

[218] *See* Rogers, *Process for Refuse Disposal in Solution-Mined Salt Cavities*, in FOURTH SYMPOSIUM ON SALT 329-36 (A. Coogan ed. 1974). Rogers, REFUSE DISPOSAL METHOD, U.S. Patent No. 3,665,716.

[219] McClain, *supra* note 184.

[220] *See* Appendix B, fig. 25.

[221] *See generally* 58 C.J.S. *Mines and Minerals* § 278 (1956) noting the general rule that one who owns surface land or a higher stratum holds subject to the right of the underlying owner to mine, but there is no right to destroy or injure the overlying land or stratum. In removing the minerals he must leave support sufficient to maintain the surface of the higher stratum in its natural state, *citing* numerous cases from the eastern coal field region including Clinchfield Coal Corp. v. Compton, 148 Va. 437, 139 S.E. 308 (1927). *See also* Annot., 55 A.L.R. 1376 (1928).

[222] 148 Va. 455, 139 S.E. 314 (1927). [223] 119 Va. 271, 89 S.E. 305 (1916).

miner is liable for subjacent support of the overlying land, presumably if that right has not been contracted away.[224] These mining cases do not involve the removal of groundwater *per se* as the cause of surface subsidence, but if the landowner is entitled to surface support, he should be entitled to it regardless of the particular physical cause of the subsidence.

Problem Case 23 Damage to surface of adjacent land by withdrawal of groundwater from mine, quarry or other excavation.[225]

The situation described in this Problem Case is illustrated for a quarry and has been litigated repeatedly for situations involving trenching, ditching, excavations for foundations of houses and cuts for roads. As illustrated, the case involves dissolution of limestone as the result of the lowering of the water table by pumping of a wet quarry. This was the fact situation in *Finley v. Teeter Stone Inc.*,[226] a fairly recent Maryland case in which liability was denied. It differs from similar situations in that no "visible soil" is removed. The material loss is caused by solution, and the damage is the result of collapse of the surface rather than simply by differential settling of highly sensitive soils. But both situations appear to be encompassed within this Problem Case.

The case law generally tends toward a finding of no liability in this factual situation,[227] but there is some contrary authority. In addition, cases are distinguished on the basis of whether the court finds that "soil" as well as water are taken or disturbed resulting in loss of lateral support.

In an early English case, *Poppelwell v. Hodkinson,*[228] liability was denied. There the defendant contractor was building a church and excavated a deep foundation which drained water from the plaintiff's adjacent land. As a result, the land subsided and the cottages on it were damaged. The court found "nothing in the common law to prevent" a person from draining his soil "if it becomes convenient or necessary." *Poppelwell* can be cited for the precedent that while there is an absolute duty not to remove lateral support, there is an exception when the lateral support is removed solely through the agency of the withdrawal of groundwater.

The case law generally follows *Poppelwell,* as does the Restatement (Second) of Torts Section 818. The cases which differ from *Poppelwell,* for

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[224] *See, e.g.*, Pennsylvania v. Mahon, 260 U.S. 393 (1922).

[225] *See* Appendix B, fig. 26.

[226] 251 Md. 428, 248 A.2d 106 (1968).

[227] *See, e.g.* Ball v. Nye, 99 Mass. 582 (1868). *Contra,* Farnadis v. Great Northern R. Co., 41 Wash. 486, 84 P. 18 (1906), where defendant company tunneling in a street tapped groundwater affecting the lateral support of plaintiff's land.

[228] L.R.4 Exch. 248 (1869).

example, the Massachusetts and Ohio cases below, find the courts distinguishing removal of soil, sand, clay, silt or other material mixed with groundwater from the removal of groundwater alone, and finding liability generally on a strict liability basis and without much discussion of the role of water. The Restatement (Second) of Torts Section 818 (Tent. Draft No. 17, 1973) recommends revision of the rule but finds little support in the case law for imposing liability for removal of lateral support from groundwater interference alone.

The leading Ohio case, *Columbus v. Williard,*[229] found the city in the 1890's constructing a sewer and pumping sand and water out of the excavation which was "so blended" as to be "inseparable." The trial court found for the plaintiff based on the doctrine of liability for removal of support material, noting the contrary doctrine.

In a similar fact situation in 1964, however, the Massachusetts court did hold a contractor liable. In *Gamer v. Milton*[230] the contractor was removing gravel from the area of Turner's pond for the Town of Milton. To get the gravel, he pumped water out of the pond and into a nearby creek (thus wasting it?). The pumping lowered the water table by 24 feet in the gravel pit and removed sufficient water from the subsoil to cause settling of adjacent houses around the pond. The court held the contractor (and town) liable on the basis that he did not take precautions to establish observation holes to see if the water level was going down (a duty he apparently had!), and that he did not establish recharge wells. Note that the court specifically found that this was *not* a case involving a question of water rights saying that "a landowner has the absolute ownership in subsurface percolating water on his land. He may use it as he sees fit, even if such use results in loss of water in his neighbor's land."[231]

The court cited *Cabot v. Kingman*[232] as governing. In *Cabot* a contractor, without taking precautions, pumped a mixture of fine sand and silt in water out of a trench and removed this "soil" from the plaintiff's land. In *Gamer,* the court said there was no basis to distinguish *Cabot* merely because there was no evidence of any soil in the water removed by the contractor. That is, in *Cabot* the court was saying that the lateral support being removed was soil in water which is the same as removal of soil and rock. Here the court went farther than *Cabot* and said that the soil does not have to be removed; lateral support can be removed solely by removing water. It held "the contractor was negligent in causing the removal of percolating water in surrounding areas, and the resulting settling of adjacent houses without digging observation holes, sheath-

[229] 7 Ohio C. Dec. 33 (1893), *aff'd,* 54 Ohio St. 615 (1896).
[230] 346 Mass. 617, 195 N.E.2d 65 (1964).
[231] *Id.* at 620, 195 N.E.2d at 67.
[232] 166 Mass. 403, 44 N.E. 344 (1896).

ing or sinking recharge wells, even though the water carried no soil in it."[233]

There is considerable confusion in the language of courts regarding the removal of lateral support and what it takes to remove lateral support. Thus in an earlier Massachusetts case, *New York R.R. v. Marniccuci*,[234] a mixture of water and silt was found to be the same as sand (a conclusion which would rate the court an "F" in freshman geology) and the court held that an action will lie for an excavation causing injury to soil of an adjacent owner in its natural state, but no recovery will be allowed in the absence of negligence or direct trespass to structures by excavating adjoining land. The court found that the sheathing had not been driven deep enough to prevent groundwater seepage and the contractor was held negligent in not doing so, having a duty of reasonable care to prevent such seepage and collapse.

While the court might not have found the contractor liable if only groundwater seepage were the cause of the damage, the mixture of the silt with water was sufficient to recognize this as removal of lateral support. Apparently, the court was seeking some justification of its solution, regardless of the fact that it was a fair one. Note that the silt and sand would not move in a low relief situation without the presence of water.

A contrary position was reached in *Finley v. Teeter Stone, Inc.*[235] Teeter owned 100 acres which he used for quarrying limestone since 1958. The quarry floor was excavated to a depth of 80 feet in the Wakefield Marble, a rock formation which contained many sink holes in the valley along which it ran. The rock formation is steeply dipping (unlike the illustration in the Problem Case) and is overlain by residual clay and a soil mantle 17 to 30 feet thick at the surface. The drawdown of the water table by the pumps in the quarry greatly increased the velocity of groundwater flow in the Wakefield Marble causing an increased rate of solution. Before pumping, the water was essentially static. As a result, the storm and rain water falling on Finley's land ran through the mantle into the limestone taking with it the mantle clay into the fissures and fractures in the limestone at an increased rate. The result was the collapse of the clay mantle over such fissures up to the surface and the formation of sink holes on Finley's land.

Part of the issue here revolved around the question of lateral support, that is, how could Teeter be held liable for removing lateral support when the support directly causing the sinkholes was vertical? However, the court found that no negligence was alleged or found on the part of Teeter in pumping his quarry. There was no claim or evidence of an underground stream and no

[233] 346 Mass. at 620-21, 195 N.E.2d at 67.
[234] 337 Mass. 469, 149 N.E. 680 (1958).
[235] 251 Md. 428, 248 A.2d 106 (1968).

proof of loss of lateral support, all factors which might influence a decision on grounds other than those considered. It appears that the situation was viewed as a question of the right to subjacent support "laterally." In any case, the court in its explanation of its ruling said:

> It was suggested [that] . . . an expanded "American Rule" should be adopted by us. There is little question the Finleys have been gravely injured by the sink holes, and although we are sympathetic with their plight, we are of the opinion that we must adhere to the authorities we have cited. If the present law requires change . . . a remedy lies with the General Assembly.[236]

The injury to the Finleys was held to be *damnum absque injuria.* The argument was made that the law relating to use of percolating water should not apply and that the law relating to support of the land should be dispositive. But the court, in considering this argument, reemphasized the difference between subjacent support and lateral support, saying there was "no sidewise movement of soil or rock from Finley's land" into the Teeter quarry (hence not following the Massachusetts court in *Gamer*) and argued that:

> Water . . . is known to flow in response to virtually every change in conditions. *It is primarily because of this dynamic quality* that we cannot hold that interference with the support provided by water is subject to the same rules of absolute liability that are imposed on a landowner who deprives his neighbor of the natural support provided by soils and other more solid materials (emphasis added).[237]

Without regard to the different chemical nature of the rock, there really can be no question that this mineral material, the calcium carbonate making up the Wakefield Marble, was "stationary and provided a foundation for the overlying land" and was caused to be "removed from its position of rest." Thus, it should have satisfied the tests which the court posed for evidence of lateral support. As noted in Myers,[238] the case has been criticized, yet it is a majority holding.

Unlike the Problem Cases dealing with the interference of one groundwater user with another (the resultant problems of management of groundwater in addition to liability), this Problem Case deals primarily with liability and consequently can be viewed in terms of a choice of social policy regarding the allocation of risk for damage. Either rule would work, if insured against.

Problem Case 24 Damage to groundwater supply by surface collapse or subsidence underground mining.[239]

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[236] *Id.* at 445, 248 A.2d at 116-17.
[237] *Id.* at 443, 248 A.2d at 116.
[238] *See* MYERS, *supra* note 6, at 577.
[239] *See* Appendix B, fig. 27.

This rather rare situation involving water rights considers the case where the subsurface collapse of strata due to improper mining practices causes the loss of groundwater supplies. As illustrated, it involves the actual loss of the well string. The case has been litigated in Ohio in *Collieries Co. v. Cocke,*[240] where in spite of the rule that no rights to the protection of groundwater supplies exist from interference by pumpers, the defendant was found liable for the removal of subjacent support and physical damage to the water supply.

Problem Case 25 Damage from slide conditions enhanced by rise in water table owing to recharge from artificial reservoir.[241]

In the case where structures are built on relatively stable soils when dry, but which become nearly liquid when wetted, the rise of the groundwater table may cause swelling and potential for landslides or flowage on gentle slopes. A tragic and profound example of the damage which can occur from this physical situation occurred in Italy where after the construction of the Viont Dam[242] there was a catastrophic slide. The rise in the water level behind the dam lubricated a major fault which had not adequately been surveyed by the surface and subsurface geologic and engineering exploration of the area. Further rise in the water level behind the dam after its completion caused noticeable movement of visible slide materials above the dam. The engineers lowered the water level fearing damage to the dam itself from a potential slide. The real event was unanticipated. Slippage along the deeper seated fault occurred dumping thousands of tons of rock into the lake. The water, mixed with rock and mud, spilled over the dam in such an amount and at such a velocity that it went down the narrow valley and covered a substantial part of the village of Villalonga a few miles below the dam in a couple of minutes. The result was complete destruction of the town and loss of many lives.

Presumably, the destruction of the town by released surface water, regardless of the cause of the release of the water from the dam (which itself remained intact), would be compensable under the rule of *Rylands.* The less spectacular situation which does not involve surface water but simply a landslide caused by wetting the soil is not clear. It is not known whether this has been litigated in Ohio, but following the reasoning in *Miksch,* it is possible that damage from a slide due to increasing the level of groundwater could be held to be a trespass.

Problem Case 26 Damage by flooding of surface from increased water supply

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[240] 107 Ohio St. 238 (1923).

[241] *See* Appendix B, fig. 28.

[242] GASKILL, *The Night the Mountain Fell,* Reader's Digest, May 1965, at 59.

and rise of groundwater table owing to recharge from a surface reservoir.[243]

The case illustrated considers the situation where the construction of a dam and impoundment of surface waters raises the water table so that seepage through the porous strata adjacent to the reservoir causes flooding and swampy conditions on neighboring land. The case was considered by the Ohio Supreme Court in *Barberton v. Miksch*[244] where the court held the defendant liable on the theory of trespass rather than one having to do with water rights.

In an early Massachusetts case, *Ball v. Nye,*[245] the doctrine of *Rylands* was applied to subsurface flooding waters. In *Nye,* the court was dealing with a defendant who had maintained an open septic hole in his barn in which manure collected. The water in this hole seeped through the ground in a downhill direction and entered the neighboring basement through the wall and the well of Ball. The defendant pled that there was no legal liability for damages to land by mere subterranean water, citing *Greenleaf*[246] and *Acton,*[247] but the court held that one who maintains a vault so that filthy water habitually filters from it, whether above or below the surface of the ground, into the land of a neighbor, is liable in damages for the injury *without other proof of negligence.*[248]

Other courts have followed the general concept of liability from water seeping through the ground. Thus, in *Kall v. Carruthers,*[249] a 1922 California case, the plaintiff prayed for an injunction to prevent the defendant from flooding his orchard by seepage of groundwater from the defendant's rice fields. The defendant, a grower along the Sutter-Butte Canal, kept his land wet much of the year. The resultant lateral seepage of water through the dikes flooded the adjacent orchard and damaged the trees. The California court considered the question in the light of *Rylands* and found if one maintains an "artificial receptacle" which fails to properly hold water, then this falls into the category of a nuisance or under condemnation of negligence.[250]

Problem Case 27 Damage to surface by soil compaction owing to removal of groundwater and consequent collapse or shrinkage of the soil.[251]

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[243] *See* Appendix B, fig. 29.
[244] 128 Ohio St. 169, 190 N.E. 387 (1934).
[245] 99 Mass. 582 (1868).
[246] 18 Pick. 117 (Mass. 1836).
[247] 152 Eng. Rep. 1223 (Ex. 1843).
[248] 99 Mass. at 582.
[249] 59 Cal. App. 555, 211 P. 43 (1922).
[250] *Id.* at 557, 211 P. at 45. *See also* Parker v. Larsen, 86 Cal. 236, 24 P. 11 (1898); Malliet v. Taylor, 78 Ore. 208, 152 P. 873 (1915).
[251] *See* Appendix B, fig. 30.

This situation may be a common one in areas where swelling clays constitute the surface of the ground. The case was litigated in *Bjorvatn v. Pacific Mechanical Construction Inc.*,[252] where the court did consider the case to be one of water rights, found that no liability existed for removal of groundwater by pumping or excavation, but nevertheless held the defendant (and the city of Seattle who had contracted for the job) liable because it was in effect condemning the property and should have been required to pay for the easement.

In *Bjorvatn,* the defendant had excavated a trench 36 feet deep for a sewer which was below the groundwater table. The effect was to lower the water table increasing the effective load on compressible soil supporting the house of the plaintiff. The plaintiff had purchased the house with significant damage due to previous soil compaction. He repaired the house and no further damage occurred until the sewer work began. Then the house settled again, the fireplace cracked and the chimney separated from the wall.

The court found that the construction was the proximate cause of the house settling and awarded $5,000 in damages. The defendant had claimed that he had rightfully impeded the groundwaters and relied on *Evans v. Seattle,*[253] in which the defendant opened a gravel pit draining away a spring with impunity. The court in *Bjorvatn* agreed with the decision in *Evans* but distinguished it from the situation here by noting that the metropolitan government is not the same as a private landowner who is interfering with another private landowner. Instead, the city, acting in the role of condemnor by removing vertical and lateral support, was in violation of the constitution of the state of Washington if it took the plaintiff's property without compensation.

Problem Case 28 Damage from landslides around a reservoir caused by rapid fall of the reservoir level and water table.[254]

The situation envisioned here is the opposite of that presented in Problem Case 25. Both are physically possible, depending on the soil conditions, although the addition of water to the soil is generally more often the cause of landslides than its removal. No cases were found in which this situation was litigated.

CONCLUSION

General Groundwater Rights

Under the absolute rule, as announced in *Acton* and *Frazier,* individualism is permitted to reign rampant so long as malice, negligence or useless waste is not shown. While Ohio and Vermont still follow this doctrine, the obvious impossibility of its relentless application to a society which has become more

[252] 164 P.2d 432 (Wash., 1970).
[253] 182 Wash. 450, 47 P.2d 984 (1935).
[254] *See* Appendix B, fig. 31.

dependent on groundwater supplies for industry, agriculture and large scale domestic needs, has led to its modification in many states.[255]

Missouri, Delaware and Wisconsin which operate under the reasonable use rule, as modified, permit each private landowner the reasonable use of water, including allowance for some harm to the common groundwater supply of neighbors. This also applies to interference with groundwater from other reasonable uses of the land. As applied, the rule may require that water cannot be transported away from the property where it is located to the injury of other overlying landowners, even though use away from the land may be more beneficial to the community. In addition to this undesirable consequence, the reasonable use rule is seen by some as totally ambiguous and unpredictable. It provides "no guide" to prospective water users,[256] nor does it offer even part protection to the "little guy." Strict application of the reasonable use rule does not permit the courts to consider and evaluate the various factors on both sides and arrive at an accommodation.[257]

To overcome this difficulty, an equalitarian rigidity has been introduced in the name of correlative rights under which, in a time of water shortage, each landowner is entitled to a share of the underlying water in proportion to the amount of land he owns as compared with the total area supplied by the common water source. While this provides little assurance to developers unfamiliar with the hydrologic data necessary to estimate long range water supplies and may take no account of the relative value of different uses to be made to the community, it squarely faces the problem of the tragedy of the commons.

However, neither the reasonable use nor correlative rights rule succeeds in removing the basic drawbacks of judicial administration of groundwater distribution, assuming that the judiciary is charged with that responsibility. The hydrologic data required for adequate information about supply, evaporation and movement of groundwater are initially expensive to obtain and the courts do not have sufficient staff assistance to do that job. Consequently, parties must supply experts and they are acquired only at considerable expense. Adequate information usually requires long term collection of data on the interdependence of water, weather and land use in a particular locality. Moreover, the courts have a long, but not particularly laudable record, of ignoring scientific developments in the field of groundwater. They are certainly not expert agencies from an engineering perspective, and may gain little from listening to the opposing views of scientists who are hired by the opposing

[255] *See, e.g.*, MacArtor v. Graylyn Cress III Swim Club, 41 Del. Ch. 26 (1963); Higday v. Nickolaus, 469 S.W.2d 859 (Mo. 1971); State v. Michels Pipeline Construction Inc., 63 Wis. 2d 278 (1973).

[256] Higday v. Nickolaus, 469 S.W.2d at 867 (Mo. 1971).

[257] MacArtor v. Graylyn Cress III Swim Club, 41 Del. Ch. 26 (1963).

parties. This is especially shown by the cases where parties seek injunctions to prevent harms they have not yet suffered.[258] The courts require the clearest kind of proof which is frequently not forthcoming for various reasons. In many cases parties frequently must wait for the dubious remedies available after the harm has occurred.

Judicial failure to achieve rational distribution of groundwater supplies in the course of litigation, and the establishment of rules which do not reflect physical reality are, of course, not only harmful to the litigants but also to the community. As a result, a permit system administered by a branch of the state government has been adopted in most western states and in some central and eastern ones (*e.g.*, Indiana, Iowa, Florida) for various reasons. In Ohio, there are growing areas of water shortage and the State Assembly hearings in the summer of 1974 attest to a need in Ohio for some method of assurance of adequate groundwater supplies, especially in those areas which are "critically" short.[259]

Recommendations of the National Water Commission Compared to Ohio Law

The Final Report of the National Water Commission,[260] published in 1973 and undertaken pursuant to the provisions of Public Law 90-515 for the purpose of recommending policies which the nation should adopt for the efficient, equitable and environmentally responsible management of its water resources, speaks to the problems of groundwater management. The Commission recognized three principal problems of groundwater law, management and administration: (1) the integration of management of surface and groundwater; (2) the depletion of groundwater aquifers at rates exceeding recharge (mining groundwater); and, (3) the impairment of quality. The Commission's recommendations to solve problems one and two are worth noting for Ohio because, as will be seen, Ohio's common law does not coincide with these recommendations.

As shown in the case of *Warder*[261] and the Problem Cases dealing with the interference of groundwater supplies from quarrying, mining and road construction, there is often a natural interrelation between surface and

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[258] *Id.*

[259] *See* OHIO LEGISLATIVE SERVICE COMM'N, AGRICULTURAL GROUNDWATER SURVEY, STUDY REPT. No. 7 at 2, reports:

> . . . six of the counties considered the water supply situation "critical" for more than 50% of the farm residents in that county who are dependent upon groundwater. The questionaire in asking this question defined "critical" to mean that "the farmer's ground water supply is or may be inadequate to carry on normal farming operations, not including irrigation, and that he has no feasible alternative surface supply—i.e. he is, or is about to be, out of water."

[260] NATIONAL WATER COMM'N, WATER POLICIES FOR THE FUTURE (1973).

[261] 9 Ohio Doc. Reprint 855 (1855).

groundwater. Recommendation No. 7-1 of the Commission is that states should recognize this integration, that rights in both sources of supply should be integrated, and uses should be administered and managed conjunctively. Further, it recommends that there should not be a separate codification of surface water law and groundwater law, rather the law of waters should be a single, integrated body of jurisprudence. With the exception of the holding in *Warder*, this recommendation is contrary to Ohio's common law.

The Commission recommendation No. 7-2 is that where surface and groundwater supplies are interrelated and where it is hydrologically indicated, maximum use of the combined resource should be accomplished by laws and regulations authorizing or requiring users to substitute one source for another. Clearly, this recommendation cannot be executed in Ohio under the prevailing conflict between the laws of surface riparian rights and the rule of *Frazier* without comprehensive legislative action.

In its recommendation No. 7-3, the Commission suggests that states, in which groundwater is an important source of supply (as it is locally in Ohio), commence conjunctive management of surface and groundwater through public management agencies. This approach was recommended as part of the legislative hearings in Ohio in 1974. In addition, there are several surface water conservation agencies extant in Ohio, including the Three Rivers Watershed District. Others are provided for by Chapter 6105 of the Ohio Revised Code. Their powers touch on, but do not comprehensively begin to afford, the proper management of groundwater supplies. Recommendation No. 7-4 suggests the establishment of such water management agencies and outlines the potential powers, including financial, acquisition and alienation of property, operations, and authorization to sue and be sued.

Finally, the Commission recommended in No. 7-5 that states adopt laws and regulations to protect groundwater aquifers from injury, with the right of enforcement available to both private property owners and public officials. As envisioned, the regulations would cover activities likely to be harmful to aquifers from activities not related to water use, such as mining or construction, which could interfere with recharge, removing support by subsidence or lateral support as discussed in previous Problem Cases.

Knowledge and Knowability in Groundwater Law

As the court in *Erickson* so succinctly put it: "The distinction between rights in surface and underground waters is not founded upon the fact of their location above or below the ground, but on the fact of knowledge with reference thereto."[262] This is the problem which Judge Brinkerhoff confronted in the *Frazier* case. Where knowledge of the groundwater situation did exist,

[262] 105 Minn. 182 (1908).

either because it was "notorious,"[263] or as a result of scientific study,[264] some courts have said there is a liability for interference.

The *Labruzzo*[265] case suggests that a negligence approach is proper. Following that line of reasoning, a standard could be applied which related liability to knowledge. The crux of the problem is how to apply the standard in the case of domestic wells or in cases where the supply development was not the activity that caused the interference. In the first instance, the question could be: Did the interferor know or have reason to know that the activity would materially affect the interferee's water supply? In the case of substantial commercial developers, industrial developers, national, state and local governments, the contracting of a groundwater study, drilling by a commercial drilling contractor, an engineering firm or a governmental agency might be presumptive evidence or at least an indication or test that knowledge of the groundwater situation existed.[266] Admittedly, the problem does not go away. In *MacArtor,* the court essentially applied strict liabiliy to the interferor, after the fact, on the basis of the reasonable use rule saying that such procedures allowed the court to consider the intentions of the offending party and his actions subsequent to the discovery of the consequences of his use of the water. One might ask why go to the intentions, why not just consider the effect of knowledgeable interference?

The *MacArtor* court's approach is similar to the strict liability of *Rylands, i.e.,* the duty is absolute. The test is: Did the damage occur and was the defendant's action the cause of it? Similar strict liability is applied to damage from oil well drilling in various states, *e.g.,* California. In the case of domestic or individual well development, the knowledge would have to be pled and proven.

Current important problems are related to large groundwater supply needs, large pumpers, large scale earth works and projects with intentional or negligent interferences. Thus, in many permit states, and proposed for Ohio in the so-called critical groundwater areas, only persons planning to exploit supplies over a certain amount (*e.g.,* 50,000 gallons per day) need permits. A permit system is essentially an appropriation system, but works only for large pumpers, inasmuch as domestic supplies generally are excluded by the minimum amount. It is believed here that the permit system is the eventual, even inevitable, outcome of attempts to manage groundwater supplies in water scarce areas. Neither the permit system nor use of one of the common law

[263] Castalia Trout Club v. Castalia Sporting Club, 8 Ohio C. Dec. 693 (1893).
[264] Higday v. Nickolaus, 469 S.W.2d 859 (Mo. 1971).
[265] 54 So. 2d 673 (Fla., 1951). But this conflicts with tort liability for groundwater interference as stated in the RESTATEMENT (SECOND) OF TORTS 858A (Tent. Draft No. 17, 1973).
[266] *See, e.g.,* Higday v. Nickolaus, 469 S.W.2d 859 (Mo. 1971).

doctrines necessarily protects all rights in groundwater or damage caused by groundwater. Nor, will such a system necessarily reduce litigation.[267]

Where water rights are viewed as solely property rights, there is a tendency for courts to reinforce positions close to the absolute rule doctrine. Water rights viewed similarly to "rights to clean air" tend to lead to a reasonable use doctrine or a permit system. It is not the objective here to describe a system for Ohio, but whatever is adopted should be adopted in the light of ways to *manage groundwater supplies* and not on the basis of assigning liability. Whatever is done must be done in such a way as to face the problem of groundwater rights and development practices which vary tremendously from the farmer who digs a sandpoint well along his creek ten feet deep to municipalities establishing groundwater supplies of millions of gallons a day for sale.

Concerning rights to production of water (and disregarding the physical damage Problem Cases), it seems that a combination of a permit system under the aegis of a state agency and the reasonable use rule with a "knowledge v. knowability" test, would better provide Ohio with a basis for development of groundwater resources in the next few decades as it becomes a water-short area in various regions. Such an approach would tend to leave unregulated the small developer, commercial and small industrial users in a realm of land use which has unique difficulties.

Rephrased, this means that the citizens and local governments of Ohio have no capability or authority now to manage groundwater supplies which are in the ground—even in their own land—in the face of other demand. Ohio's groundwater common law, excepting the law applied to the interference with riparian rights and destruction of support, protects no supply which is not physically secure. The management recommendations cited above are minimal ones, but are in line with national recommendations for groundwater supply management. The inadequacies of Ohio's common law are known. Appropriate regulatory and legislative responses have been drafted. What remains is for the public and its public officials to recognize the need and demand the appropriate legislative response.

[267] Compare Problem Case 3, 5 and 11.

APPENDIX A
Groundwater Problem Cases List

CASE NO. — FIGURE

Interference with Groundwater Supply

1. Interference with groundwater supply to a well by pumping of another well . . . 5–8
2. Interference with a flowing spring fed by groundwater by pumping of a well . . . 9
3. Interference with groundwater supply by surface excavation below the water table 10
4. Interference with groundwater supply by reducing pressure in the reservoir; supply is still present but with less head 11
5. Interference with groundwater supply by pumping from mines 12
6. Interference with groundwater supply by changing flow lines due to subsurface mining 12
7. Interference permanently with groundwater supply by destruction of reservoir capacity owing to collapse of reservoir internally due to mining of groundwater . 13
8. Interference with groundwater supply by diversion of a stream from its original bed 14
9. Interference with groundwater supply by diversion of water from a stream for use (*e.g.*, pumping from stream or dammed lake and diversion) 15
10. Interference with groundwater supply by reducing the level of an artificial surface reservoir 16
11. Interference with groundwater supply by surface drainage projects, for example, swamp reclamation 17
12. Interference with groundwater supply by paving or other destruction of the infiltration (recharge) area 18
13. Interference with groundwater supply by subsurface grouting or cementing in mines.
14. Interference with groundwater supply by well drilling procedures such as mud programs and grouting (but not pollution).
15. Interference with groundwater supply by cavity utilization.
16. Interference with groundwater supply by damage to the water from encroachment of salt water into the freshwater supply along a coast line . . 19
17. Interference with groundwater supply by rise in groundwater table from an artificial reservoir 20

Interference with Surface Water Supply

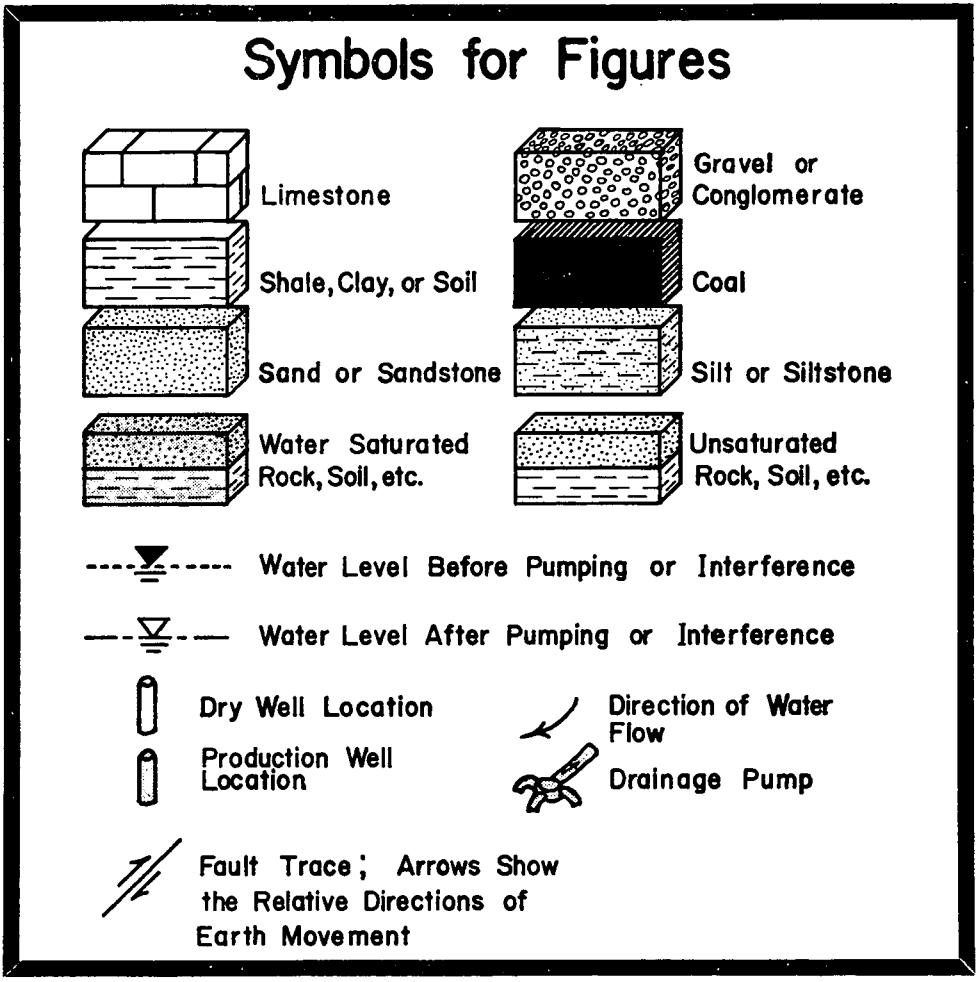
18. Interference with stream flow by use of a groundwater supply 21
19. Interference with the level of a surface reservoir or lake by use of a groundwater supply 22

Damage to Other Activities and Property by use of Groundwater Supply

20. Damage to a mine from withdrawal of groundwater 23
21. Damage to cavity utilization by withdrawal of groundwater 24
22. Damage to overlying surface by withdrawal of groundwater (collapse, subsidence, cracking, etc.) 25
23. Damage to surface of adjacent land by withdrawal of groundwater from a mine, quarry or other excavation 26
24. Damage to groundwater supply by surface collapse or subsidence from underground mining 27
25. Damage from slide conditions enhanced by increase in groundwater supply and rise in water table owing to artificial recharge from surface reservoir or groundwater reservoir 28
26. Damage from flooding of surface from increased supply and rise of the groundwater table owing to recharge from a surface reservoir 29
27. Damage to surface by soil compaction owing to draw-down of groundwater table and consequential collapse or shrinkage of soil 30
28. Damage from landslides around a reservoir caused by rapid fall of water table caused by lowering of the reservoir 31

APPENDIX B

Illustrations of Groundwater Problem Cases



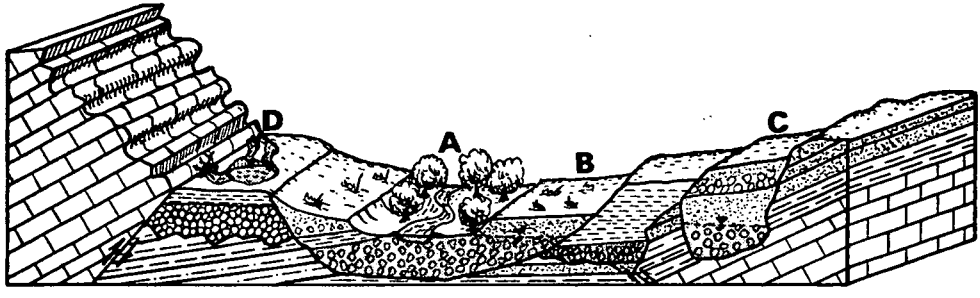


Fig. 1. Illustration of various definitions of an underground stream based on legal pronouncements and geologic conditions.

A. Line of trees where "no where found except where streams occur,"

A. Line of trees where "nowhere found except where streams occur," i.e., subbed percolating water flow.

B. Percolating water in valley fill. Note banks and channel.

C. Buried valley of pre-"A" stream filled with water-bearing porous sediment. Note channel, banks, gradient of flow.

D. Fault line between Paleozoic limestone (uplifted) and Tertiary-Quarternary sediments. Rising water along fault line flows out as springs into a lake.

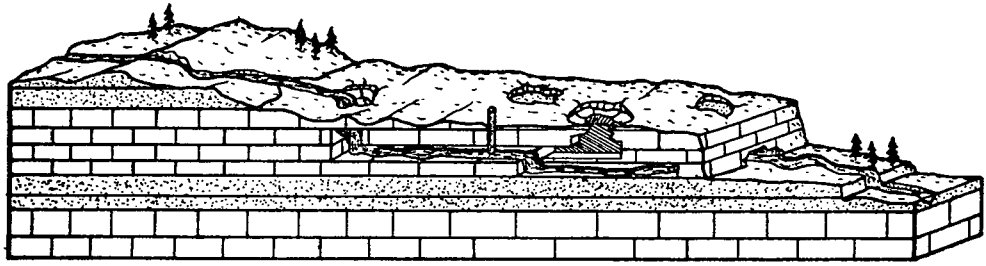


Fig. 2. An underground stream in limestone terrain, having disappeared into a sinkhole, flows underground as a turbulent stream and emerges as a spring and stream. Note the underground is undetectable from the surface without excavation at point of well.

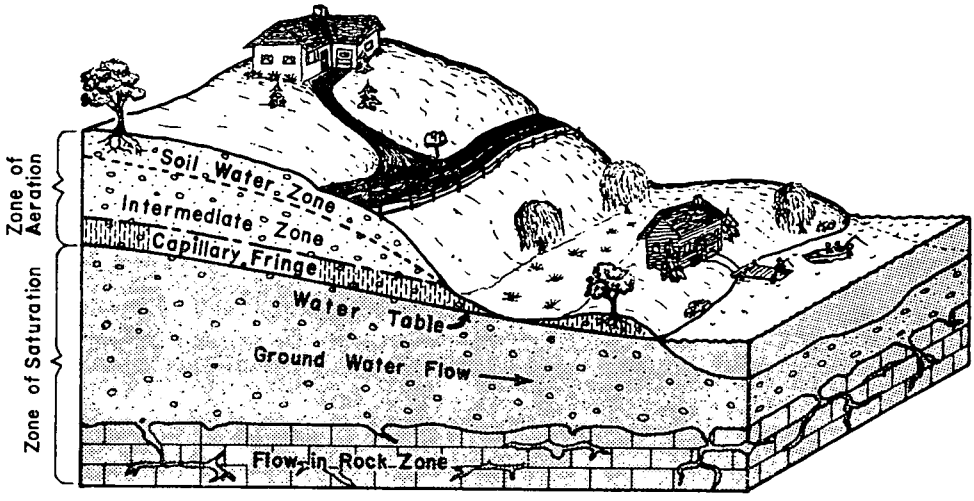


Fig. 3. Illustration of various conditions of groundwater.

1. Zone of aeration is portion of rock where pores are not saturated with water.
   a. Soil water zone is where water is held near surface in the pores of the soil zone.
   b. Capillary fringe zone is where water is held in pores by capillary forces.
   c. Intermediate zone is where there is a fluctuation of the level of water depending on the wetness of the season.
2. Zone of saturation is the zone where pores are filled with groundwater either in:
   a. unconsolidated sediment; or,
   b. in rock.
3. Groundwater table is the fluctuating interface between the zone of aeration and saturation.

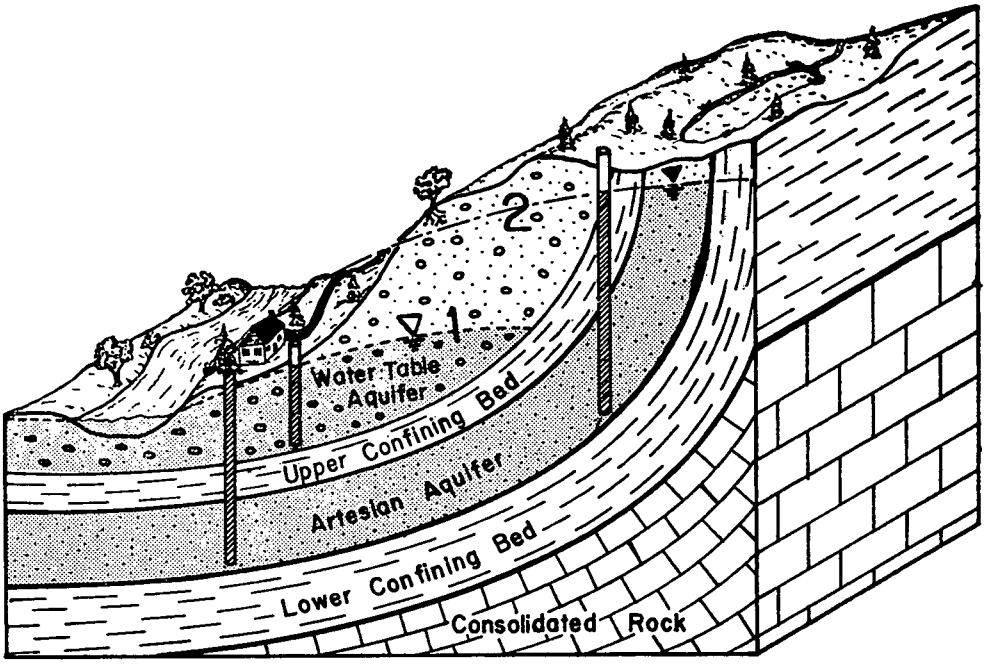


Fig. 4. Illustration of Terms.

1. **Surface stream.**
2. **Water table is interface between zone of saturation and areation.**
3. **Confining beds are beds with porosity and permability so low as to effectively prevent water movement through the rock. They are also called aquicludes.**
4. **An artesian aquifer is a porous and permable bed carrying water which when tapped by a well has sufficient head to provide water to the surface without pumping.**
5. **No. 1. Water table in unconsolidated surficial materials.**
6. **No. 2. Elevation of water table in the confined artesian aquifer.**

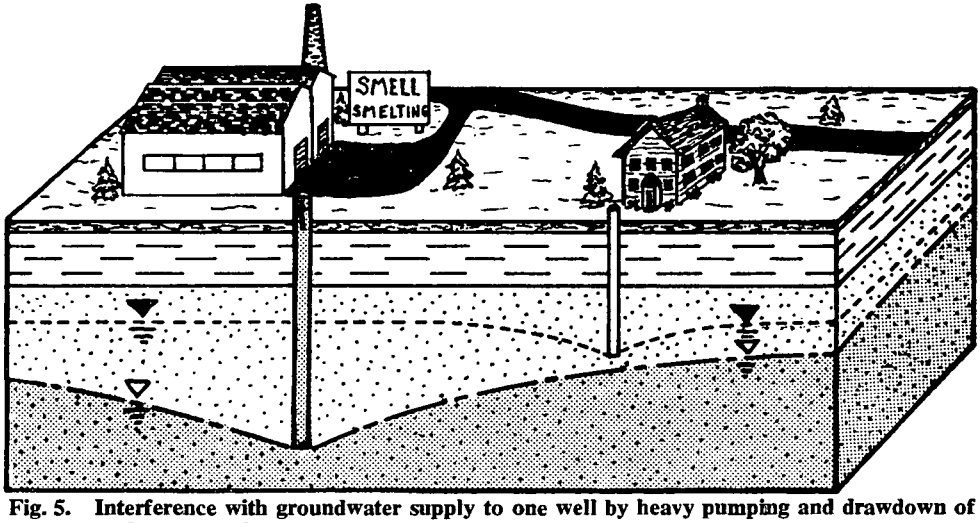


Fig. 5. Interference with groundwater supply to one well by heavy pumping and drawdown of the water table by another well.

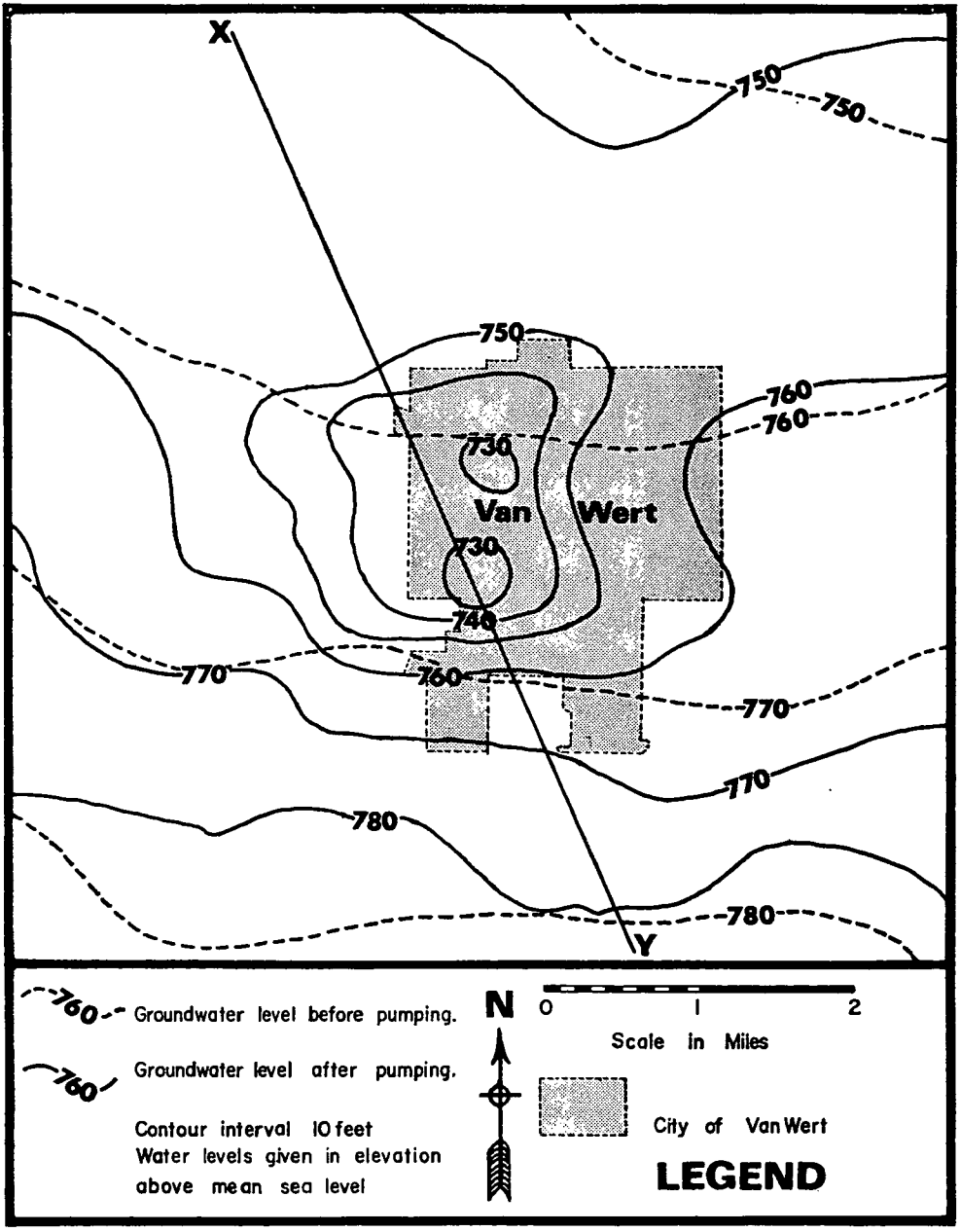


Fig. 6. Elevation of groundwater table in the vicinity of Van Wert, Ohio, before and after pumping by large industrial users. Map modified by Eagon 123, Fig. 5.

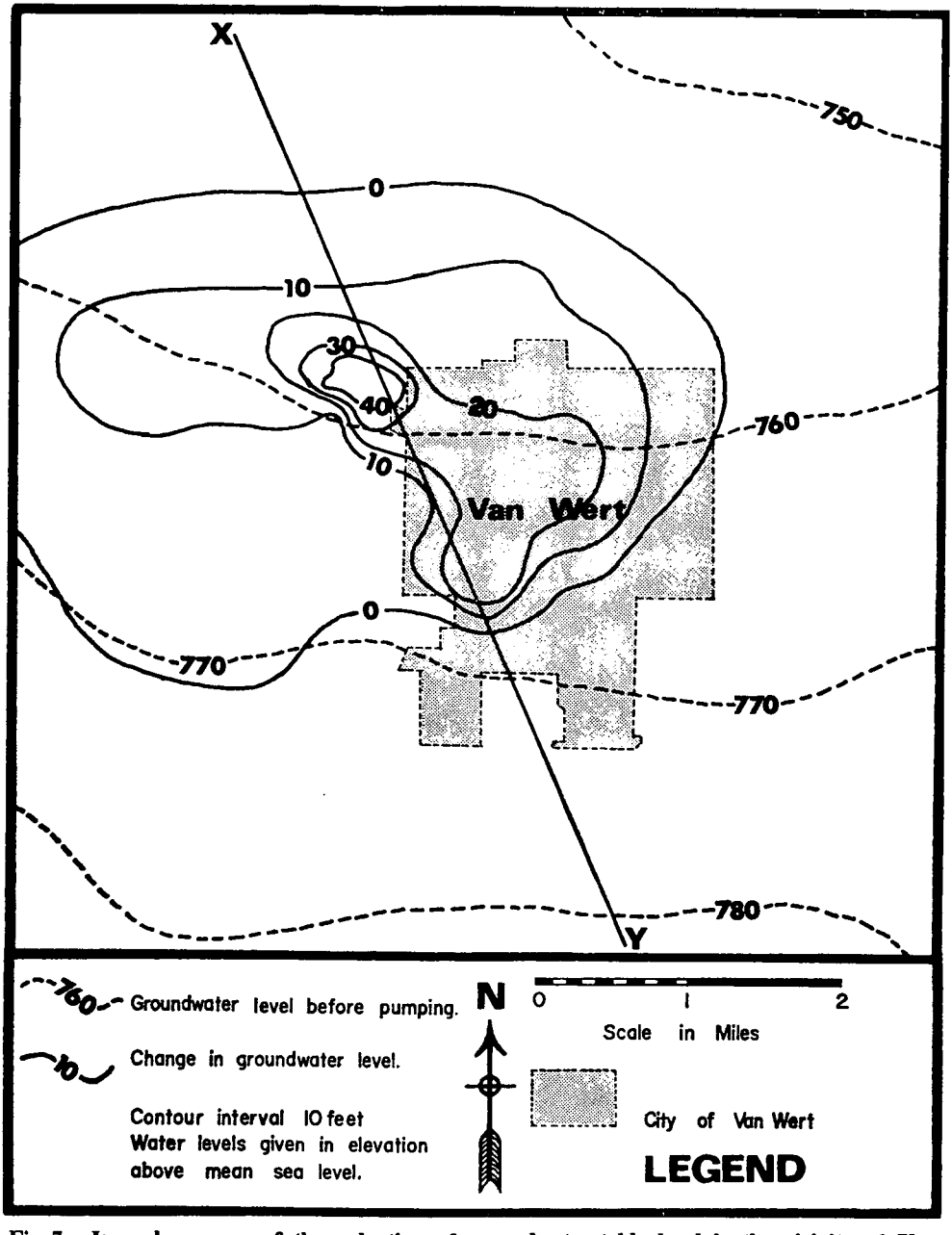


Fig. 7. Isopachous map of the reduction of groundwater table level in the vicinity of Van Wert, Ohio, as the result of industrial pumping of groundwater. North and south of Van Wert, the groundwater table is essentially unaltered. At the edge of the city, it is 40 feet lower than previous. Modified from Eagon 123, Fig. 7.

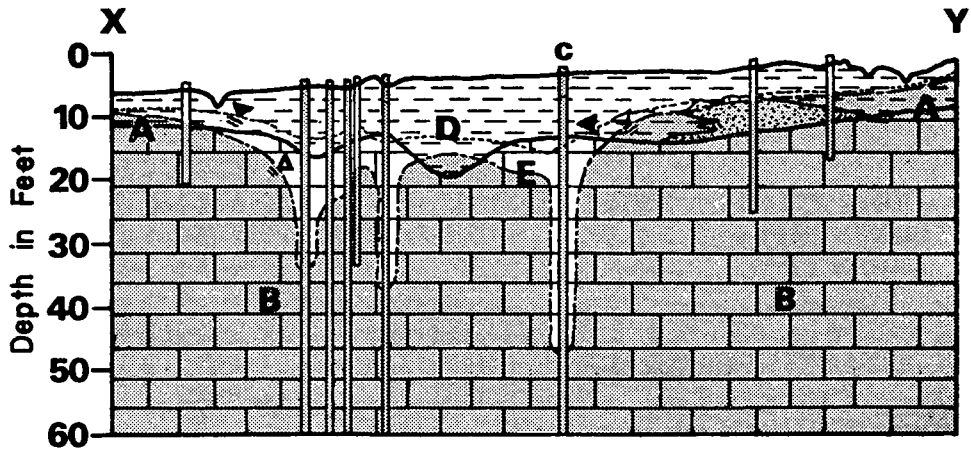


Fig. 8. Geologic cross section of portion of the Van Wert, Ohio, area showing: A. surface glacial till; B. underlying bedrock limestone aquifer; C. well of heavy industrial pumper; D. previous water table elevation; and, E. water table after pumping. Line of cross section is northeast to southwest and is shown on Figs. 6 and 7 as line X-Y. Modified from Eagon 123, Fig. 7.

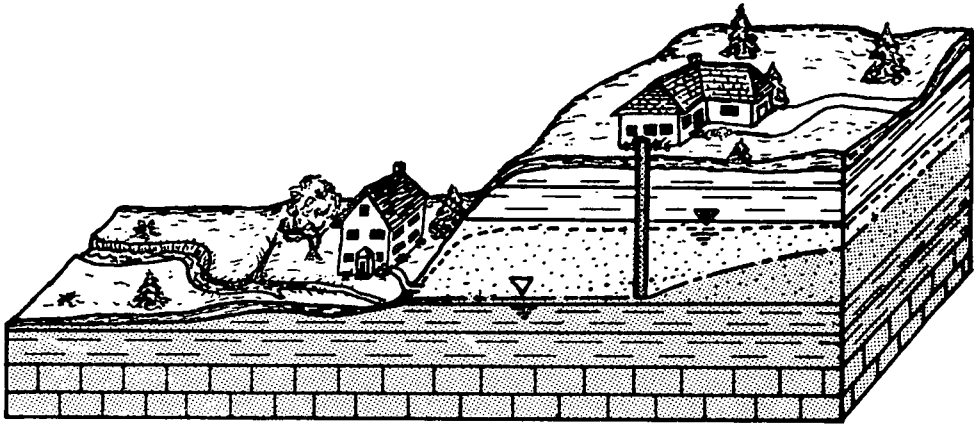


Fig. 9. Interference of a well with the supply of groundwater to a spring. Well on higher ground taps an aquifer in sandstone sharply reducing level of water table locally and removing much of the natural outflow of the aquifer as the spring which had resulted from the intersection of the water table with the surface of the land above the shale aquiclude.

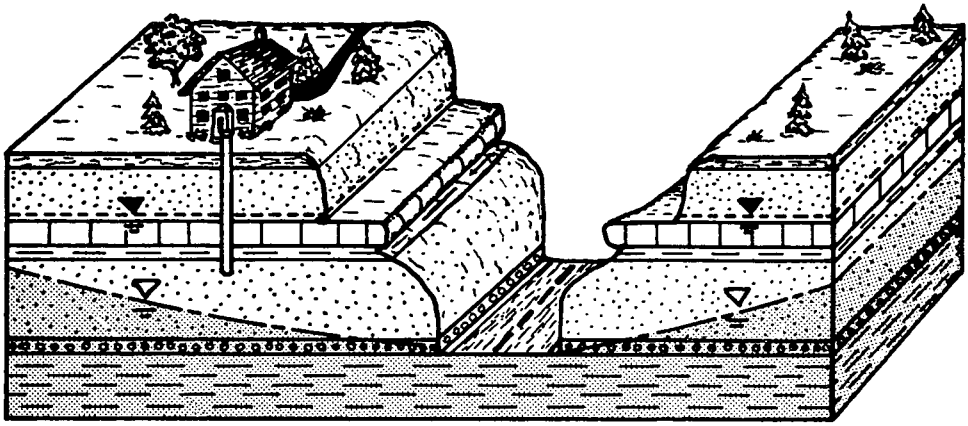


Fig. 10. Interference of a new road excavation with a groundwater supply to a well. The road cut lowers the groundwater table from its natural level in the upper sandstone to the base of the road excavation where springs form at the intersection of the gravel over the shale aquiclude with the road.

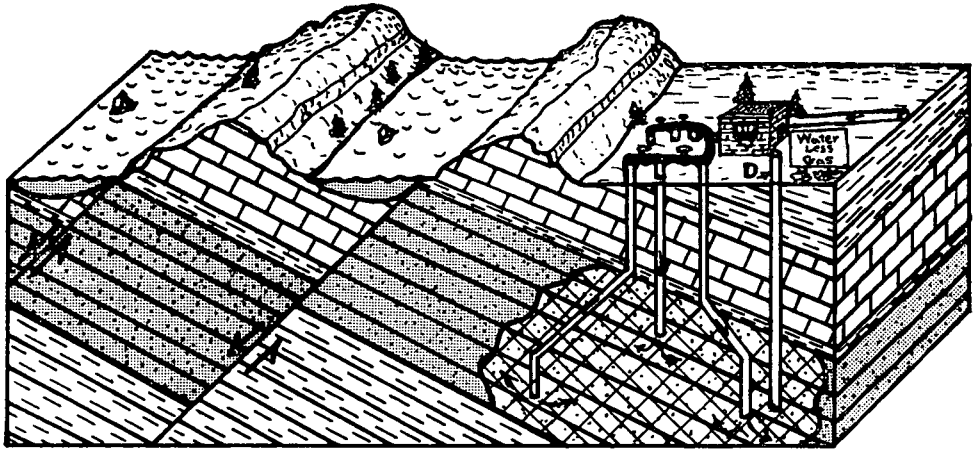


Fig. 11. Complicated interference with groundwater which flows down dip in a confined sandstone aquifer into which a gas storage facility is established. Increased pressure in the storage reservoir prevents water movement into the lower well.

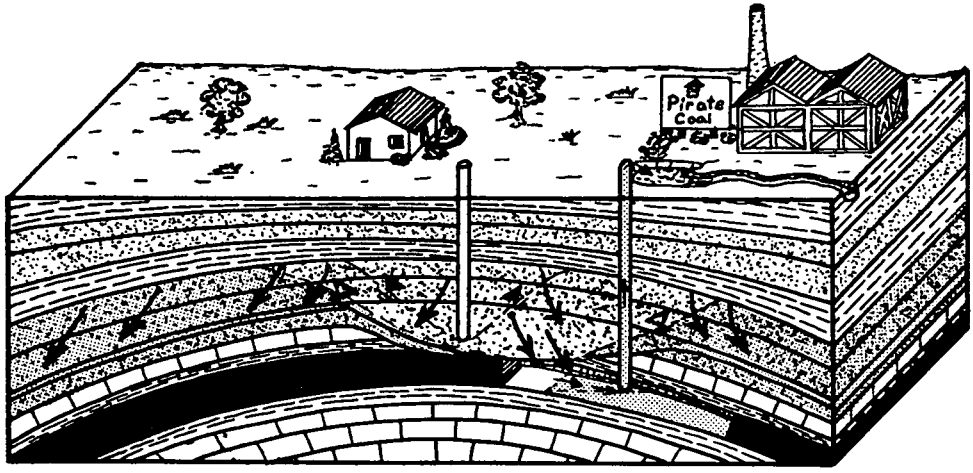


Fig. 12. Interference with groundwater supply by mining. The mining of the coal along a seam encounters a sandstone channel formed during the deposition of the sedimentary sequence. Entry of the groundwater from the sandstone into the mine reduces the head in the sandstone, lowers the water table and the amount of water available to the well (Case 5). In addition, pumping of the inflow from the mine increases the rate of flow and further reduces the amount available to the well (Case 6).

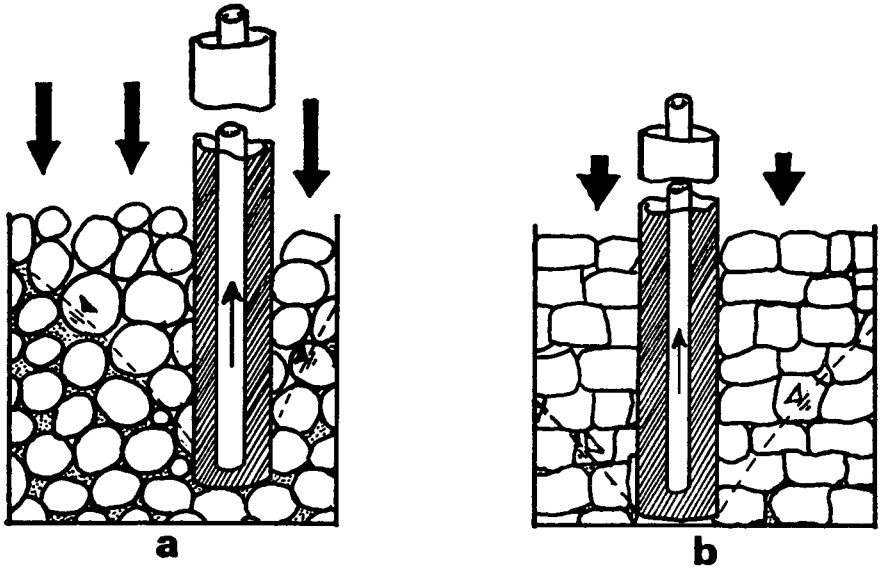


Fig. 13. Destruction of a reservoir. In 13A, the grains are held apart to some extent by the pressure of the fluid in the pores. In 13B, after complete removal of all but minor capillary water in the pores, the grains compact owing to the overburden pressure, destroying the pore space and making the rock incapable of storing fluids.

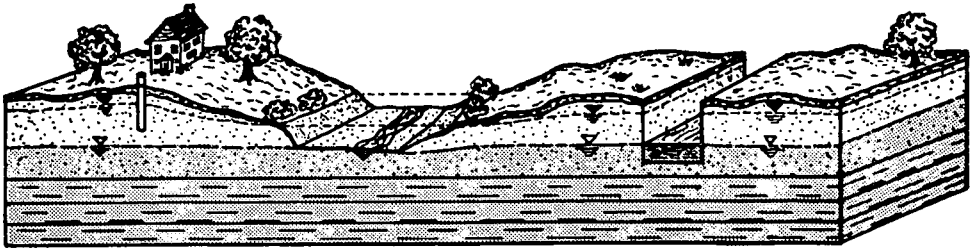


Fig. 14. Interference with an established groundwater supply by the diversion of a stream. The well, removing groundwater from a supply which is interconnected closely with a stream, goes dry when the stream water is diverted to provide flow for an artificial channel. Such a channel could be built to provide passage for ships through locks around the falls of the river, from a dam to carry water for municipal supplies or agricultural ditches.

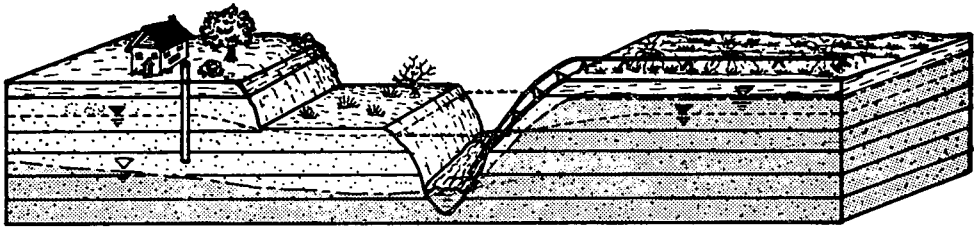


Fig. 15. Loss of groundwater supply to a well by the diversion of stream water for use by a riparian owner for agricultural sprinkling system on the opposite bank.

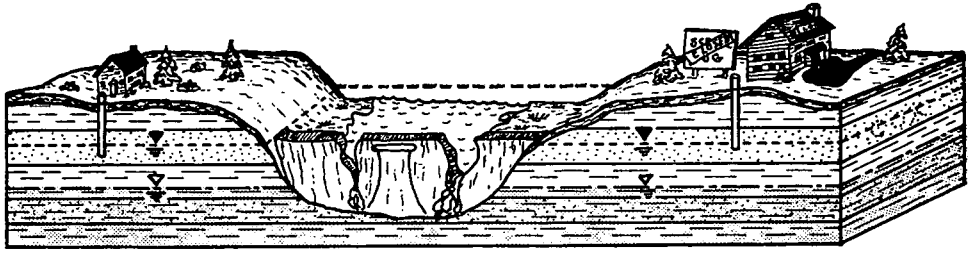


Fig. 16. Interference with water supply to wells established at time of high water behind dam. After breach of dam, water table drops and wells go dry.

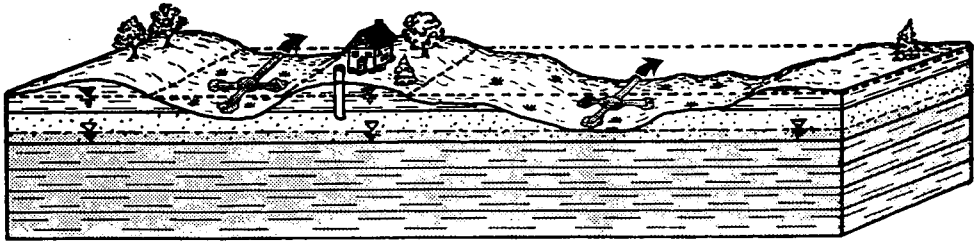


Fig. 17. Loss of groundwater by draining swamps. In this case the well is producing from a groundwater supply connected closely to the surface waters of the swamps. Swamp reclamation for land development by pumping water causes the well to go dry.

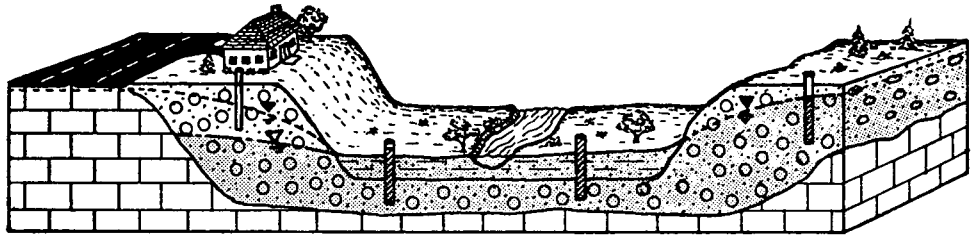


Fig. 18. Interference with groundwater supply by reduction of the infiltration of surface water in the recharge area into the saturated zone. Here the paving of the infiltration zone prevents recharge of part of the storage area causing a fall in the level of the groundwater table locally so that the well on the left goes dry.

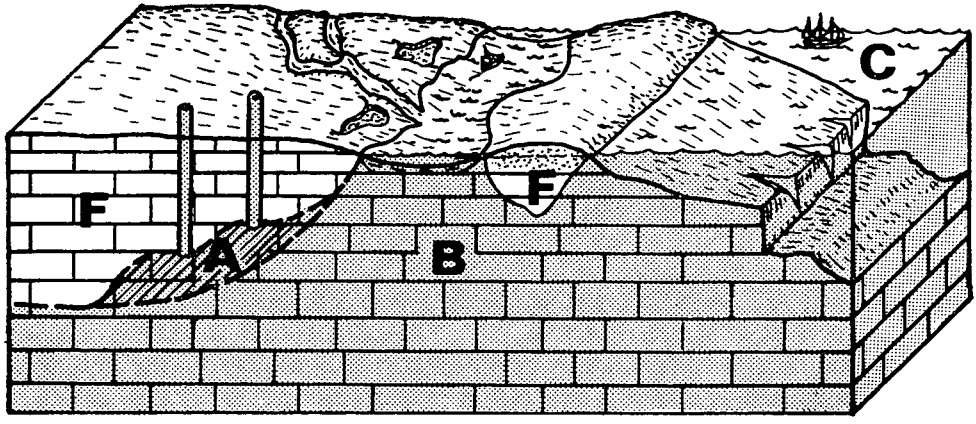


Fig. 19. Damage to the fresh groundwater supply by intrusion of salt water into wells along the coast line. The pumping of wells on land draws up the salt water which underlies the fresh water lens contaminating the wells.

A. Area of salt water intrusion.
B. Salt water lens.
C. Marine water.
F. Fresh water lenses.

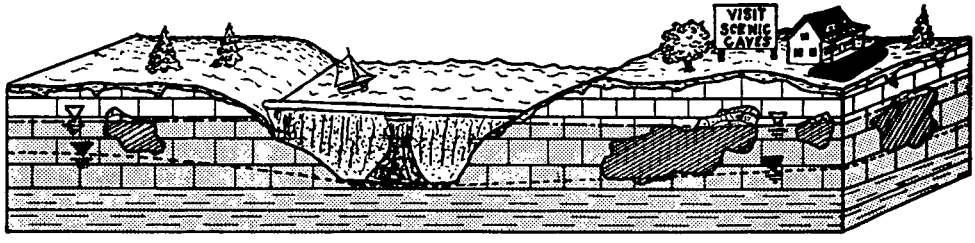


Fig. 20. The effect of raising the groundwater table by establishment of a surface reservoir causes flooding of the subsurface property of the adjacent owner making his scenic cave a grotto.

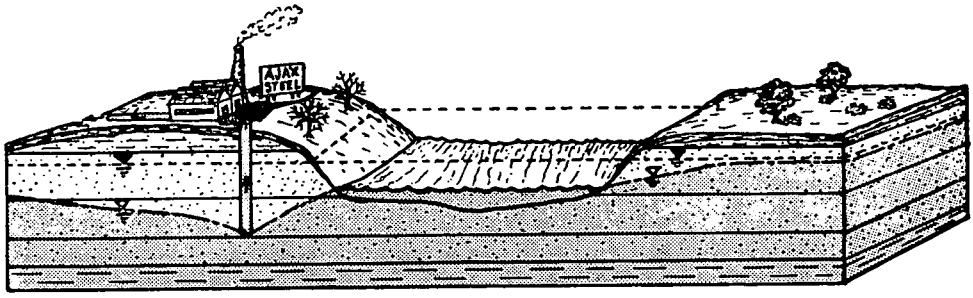


Fig. 21. Interference with stream flow by use of the groundwater supply by heavy pumping of the well which draws through the ground from the stream.

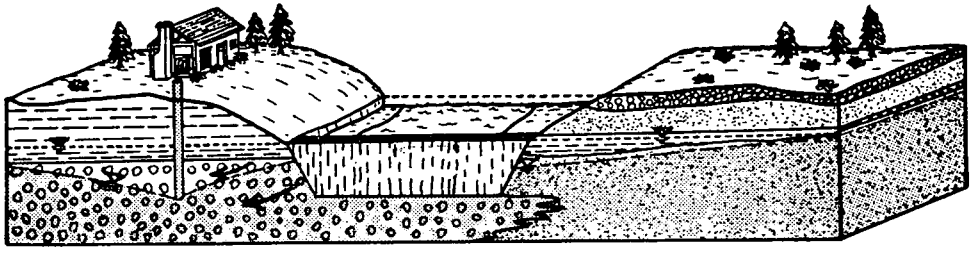


Fig. 22. Interference with the level of a reservoir by pumping a water supply from a groundwater reservoir connected with the surface impoundment. Water moves rapidly through the porous gravel into the well lowering the lake.

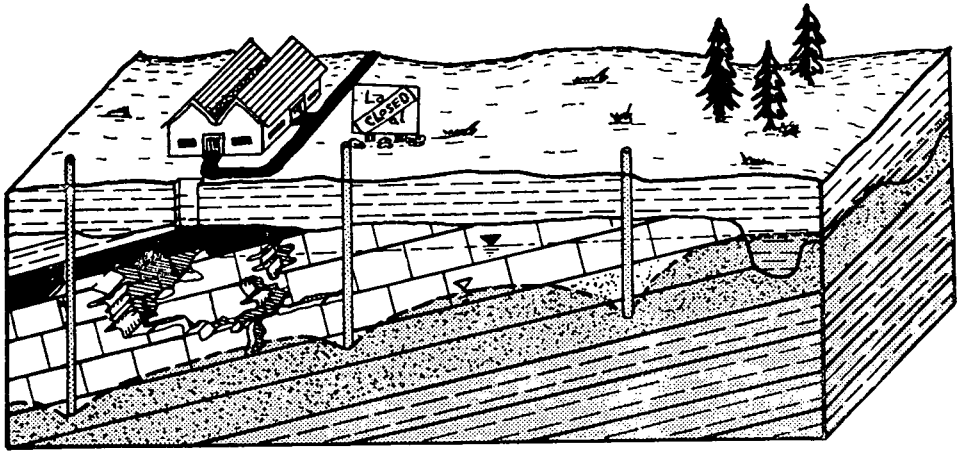


Fig. 23. Damage to a mine from the withdrawal of groundwater. The pumping of water wells in a sandstone reservoir causes lowering of the water table and solution of the overlying subsurface formation. Collapse of the limestone by cave formation causes subsurface sinkholes in the floor of the coal mine.

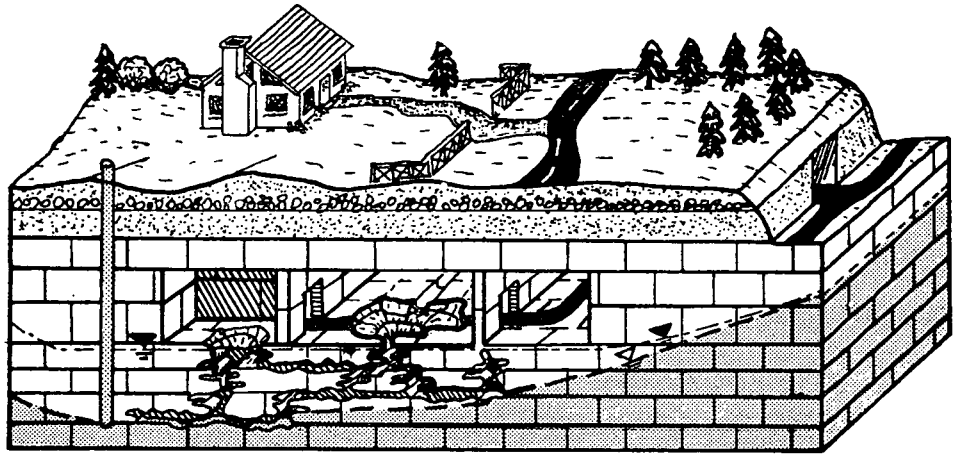


Fig. 24. Damage to an underground storage facility by withdrawal of groundwater. The well pumping from a limestone groundwater reservoir lowers the water table causing solution in the rock laterally and vertically developing sink holes in the floor of the underground storage cavity.

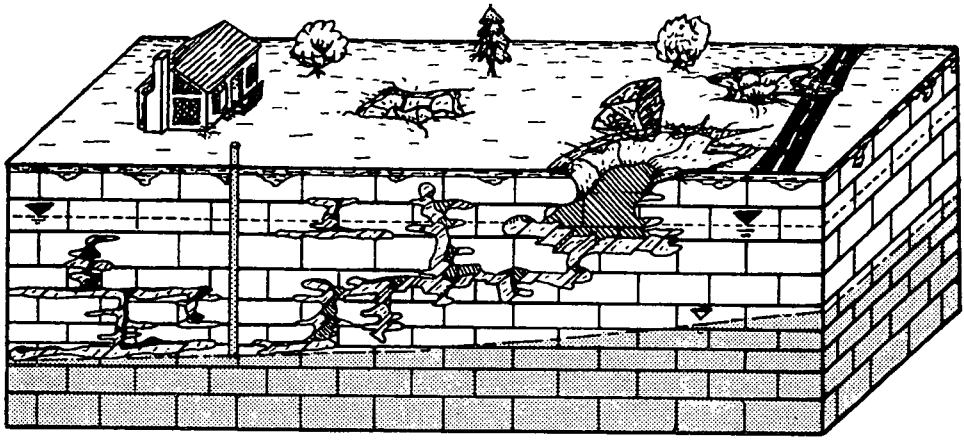


Fig. 25. Damage to overlying surface by removal of subjacent support by groundwater use. The lowering of the water table by pumping from a limestone formation causes vertical and lateral solution which reaches to the surface and results in development of sinkholes, damaging buildings and other land features.

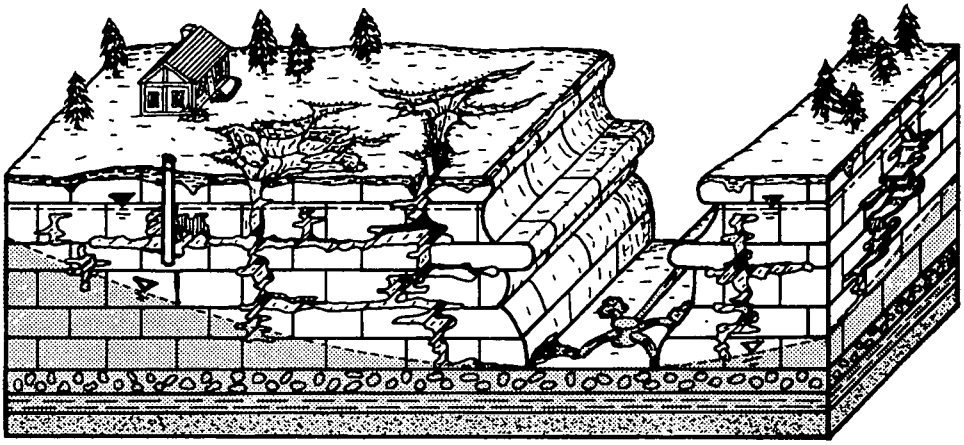


Fig. 26. Damage to adjacent land by withdrawal of groundwater from a quarry on neighboring property. Pumping of water from the quarry lowers the water table and speeds water flow through the limestone formation causing solution of the limestone and caving. The caving reaches the surface where it has its expression as sink holes.

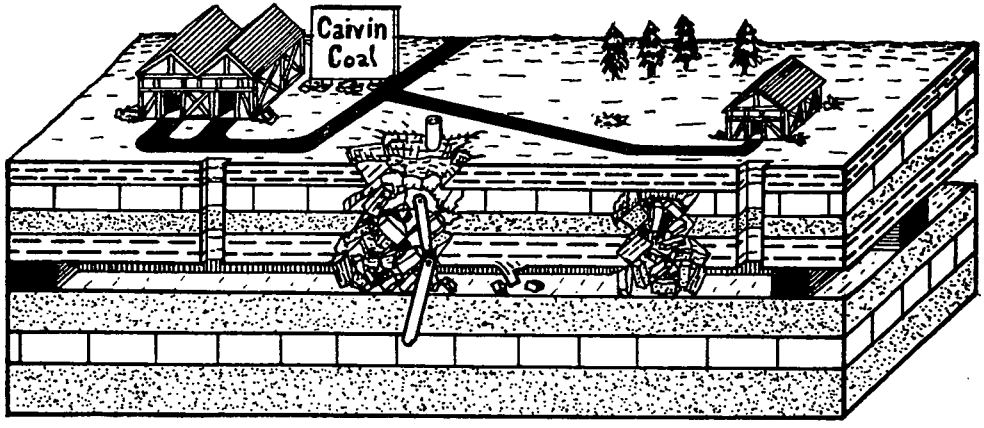


Fig. 27. Physical damage to a groundwater supply by surface collapse or subsidence by loss of subjacent support. The mining of the coal without leaving sufficient support pillars for the roof of the mine results in collapse of the overlying strata to the surface and physical destruction of the well.

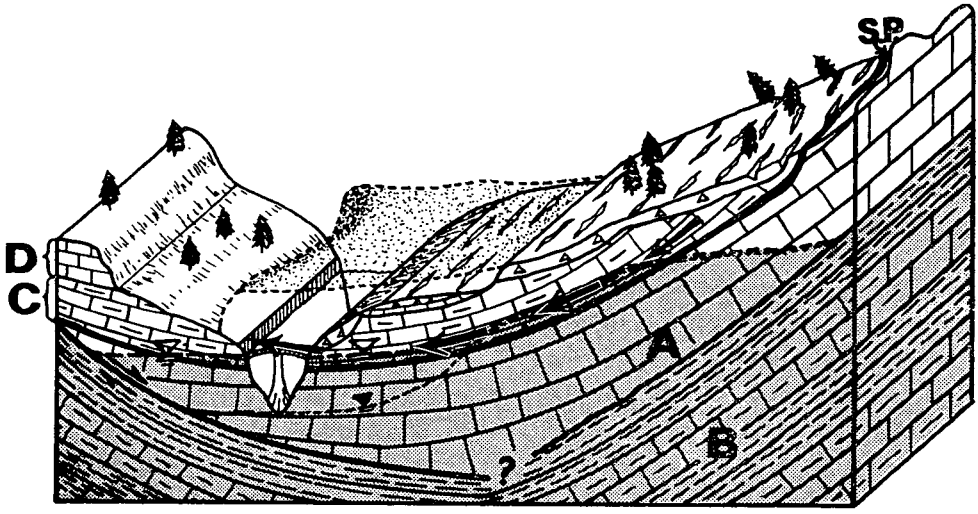


Fig. 28. Damage from a landslide caused by the rise of the water table and lubrication of a fault along which the slide occurs or reoccurs. A-D, different geologic formations of varied rock types. Arrows indicated movement along fault. Illustration shows surface cracks in slide breccia. Failure along base of formation C results in downhill movement to cause a large slide deposit covering dam lake and dam. Adapted from the Viont Dam disaster in Italy.

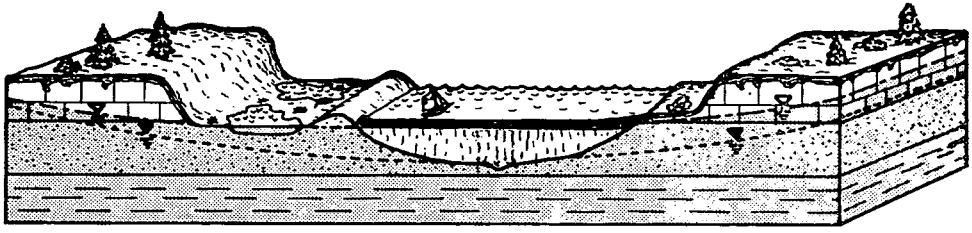


Fig. 29. Damage to adjacent land by flooding of the land from seepage through the ground. The higher water table established by the impoundment of water surface behind the dam spreads laterally.

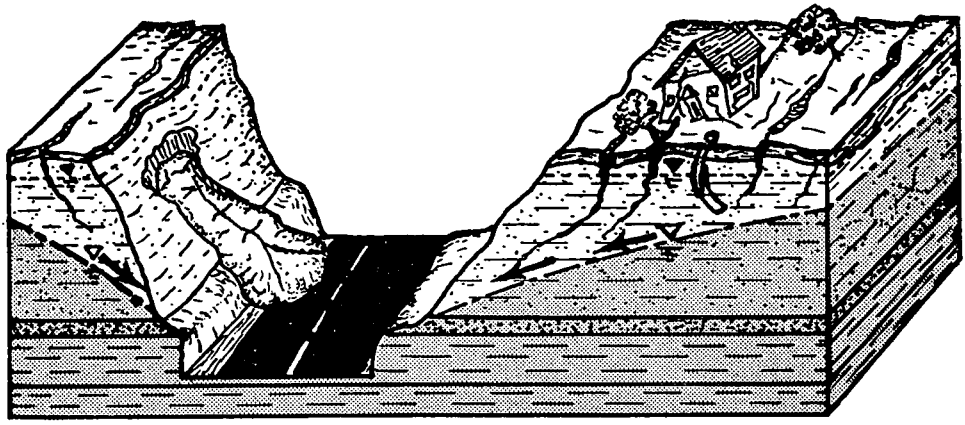


Fig. 30. Damage to the land surface and features by the lowering of the water table owing to an excavation for a new road. The lower water table causes shrinkage of surface clays which are normally saturated and sensitive. Cracking of the surface extends into and through the buildings. On the opposite side on the oversteepened face of the road cut a landslide has occurred.

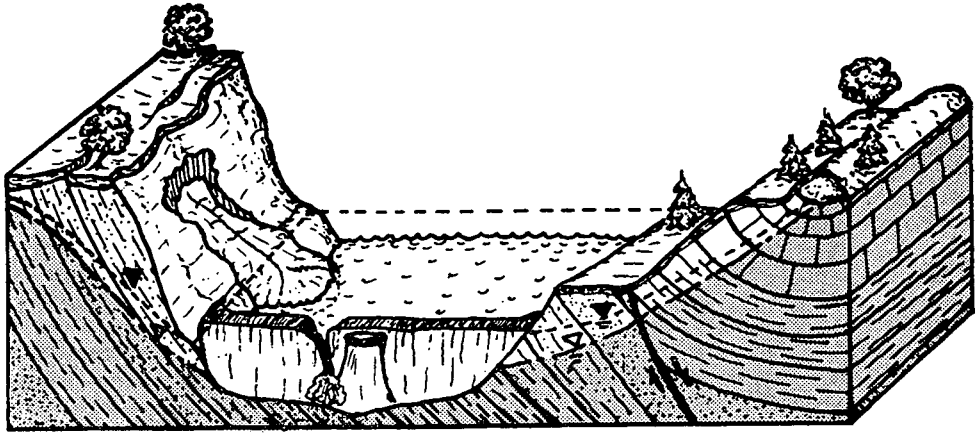


Fig. 31. Lowering of the level of an artificial surface reservoir lowers the water table causing a landslide along the edge of the reservoir causing potential damage.